*tricts of Bengal for the Fortnight ending 15th July 1877.*

SEER OF 80 TOLAHS.

AVERAGE WAGES PER MONTH.

| IZE OR INDIAN-CORN. | | GRAM. | | | FIREWOOD. | | | SALT. | | | ABLE-BODIED AGRICULTURAL LABOURER. | | | SYCE OR HOUSE-KEEPER. | | | COMMON MASON, CARPENTER, OR BLACKSMITH. | | | DISTRICTS. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Next preceding return. | Corresponding return of last year. | Present return. | Next preceding return. | Corresponding return of last year. | Present return. | Next preceding return. | Corresponding return of last year. | Present return. | Next preceding return. | Corresponding return of last year. | Present return. | Next preceding return. | Corresponding return of last year. | Present return. | Next preceding return. | Corresponding return of last year. | Present return. | Next preceding return. | Corresponding return of last year. | |
| | | | | | | | | | | | | | | | | | | | | BENGAL. |
| | | | | | | | | | | | | | | | | | | | | *Western Districts.* |
| ... | ... | 18 0 | 16 0 | 26 0 | 120 0 | 120 0 | 180 0 | 9 4 | 9 0 | 9 0 | 6 8 | 6 0 to 8 0 | 6 0 | 5 8 | 5 0 to 6 0 | 5 0 | 11 4 to 12 0 | 7 8 to 15 0 | 9 8 to 15 0 | Burdwan. |
| 36 0 | 35 0 | 16 0 | 17 0 | 21 0 | 400 0 | 400 0 | 480 0 | 8 8 | 8 8 | 8 12 | 2 13 to 4 11 | 3 0 to 4 0 | 3 0 to 4 0 | 4 0 to 5 0 | 4 0 to 5 0 | 4 0 to 5 0 | 7 8 | 7 0 | 7 0 | Bankoora. |
| ... | ... | 23 0 | 24 0 | 24 0 | 200 0 | 200 0 | 200 0 | 8 4 | 8 4 | 8 4 | 5 0 | 5 0 | 5 0 | 5 0 | 4 0 | 5 0 | 7 13 | 7 8 | 8 0 | Beerbhoom. |
| ... | ... | 13 0 | 14 0 | 18 0 | 260 0 | 260 0 | 180 0 | 9 4 | 9 0 | 9 0 | 4 0 | 5 0 | 4 3½ | 5 0 | 6 0 | 5 0 | 7 8 to 10 0 | 6 0 to 7 0 | 4 0 to 6 0 | Midnapore. |
| ... | ... | 16 0 | 16 0 | 26 0 | 120 0 | 120 0 | 120 0 | 9 0 | 9 0 | 9 0 | 6 8 | 5 0 | 6 8 | 5 0 to 6 0 | 5 0 to 6 0 | 5 0 to 6 0 | 7 8 to 15 0 | 7 8 to 12 0 | 7 8 to 15 0 | Hooghly. |
| ... | ... | 14 0 | 16 0 | 8 | 110 0 | 120 0 | 120 0 | 10 0 | 10 0 | 9 12 | 7 0 | 8 0 | 7 0 | 7 0 | 7 0 | 7 0 | 12 0 | 13 0 | 12 0 | Howrah. |
| | | | | | | | | | | | | | | | | | | | | *Central Districts.* |
| 25 0 | 24 0 | 15 0 | 16 0 | 24 0 | 100 0 | 100 0 | 120 0 | 8 0 | 8 0 | 8 0 | 11 6 | 11 6 | 9 8 | 6 0 | 6 0 | 6 0 | 15 0 | 14 0 | 15 8 | Calcutta. |
| ... | ... | 18 12 | 17 12 | 20 0 | 90 0 | 90 0 | 90 0 | 9 6 | 9 0 | 9 0 | 6 0 | 6 0 | 6 0 | 6 0 | 6 0 | 6 0 | 16 0 | 15 0 | 11 0 | 24-Pergunnahs. |
| ... | ... | 21 5 | 21 5 | 30 8 | 120 0 | 140 0 | 100 0 | 9 6 | 9 6 | 9 2¼ | 6 0 | 6 0 | 6 0 | 6 0 | 6 0 | 6 0 | 7 8 to 10 0 | 7 8 to 10 0 | 7 8 to 10 0 | Nuddea. |
| ... | ... | 19 4 | 20 0 | 20 0 | 120 0 | 120 0 | 120 0 | 8 0 | 8 0 | 8 0 | 7 8 | 7 8 | 7 8 | 6 0 | 5 0 | 5 0 | 10 0 to 13 0 | 8 0 to 15 0 | 10 0 to 15 0 | Jessore. |
| ... | ... | 23 0 | 23 0 | 38 0 | 120 0 | 130 0 | 130 0 | 7 0 to 9 0 | 7 0 to 9 0 | 7 0 to 9 0 | 3 12 to 4 11 | 3 12 to 4 11 | 3 12 to 4 11 | 4 0 to 5 0 | 4 0 to 5 0 | 4 0 to 5 0 | 7 8 | 7 8 | 6 0 to 7 8 | Moorshedabad. |
| ... | ... | 15 6 | 16 12 | 25 8 | 200 0 | 200 0 | 180 0 | 8 4 | 8 4 | 8 4 | 4 0 to 5 0 | 4 8 to 5 0 | 5 0 | 4 0 to 6 0 | 4 0 to 6 0 | 6 0 | 7 0 to 12 0 | 7 8 to 8 0 | 7 0 to 12 0 | Dinagepore. |
| ... | ... | 26 4 | 26 4 to 28 2 | 26 4 to 33 12 | 200 0 | 200 0 | 320 0 | 9 0 | 9 0 | 7 14 | 4 0 to 5 0 | 4 0 to 5 0 | 4 5 to 7 0 | 4 8 to 5 0 | 4 8 to 5 0 | 4 0 to 6 0 | 6 0 to 10 0 | 6 0 to 10 0 | 5 0 to 7 0 | Rajshahye. |
| ... | ... | 16 0 | 11 6 | 18 0 | 107 0 | 107 0 | 107 0 | 7 8 | 10 12 | 7 8 | ... | ... | ... | ... | ... | ... | ... | ... | ... | Rungpore. |
| ... | ... | 18 12 | 18 12 | 24 0 | 67 8 | 67 8 | 67 8 | 8 4 | 8 4 | 8 4 | 5 0 | 5 0 | 5 0 | 6 0 | 6 0 | 6 0 | 10 0 to 12 0 | 10 0 to 12 0 | 10 0 to 12 0 | Bogra. |
| ... | ... | 22 0 | 22 8 | 30 0 | 200 0 | 200 0 | 200 0 | 9 0 | 9 0 | 8 8 | 5 0 | 6 0 | 5 0 to 6 0 | 5 0 | 5 0 | 5 0 to 6 0 | 10 0 to 15 0 | 10 0 to 15 0 | 10 0 to 15 0 | Pubna. |
| 20 0 | 18 0 | 10 0 | 8 0 | 8 0 | 160 0 | 160 0 | 260 0 | 4 8 | 5 0 | 4 8 | ... | .. | ... | ... | ... | ... | ... | ... | ... | Darjeeling. |
| ... | ... | 14 5 | 12 2 | 17 0 | 106 6 | 106 6 | 160 0 | 7 7 | 7 2 | 7 0 | 5 8 to 6 0 | 5 0 to 6 0 | 5 8 to 6 0 | 6 0 to 7 0 | 6 0 to 10 0 | 6 0 to 7 0 | 7 8 to 15 0 | 10 0 to 20 0 | 7 8 to 15 0 | Julpigoree. |
| | | | | | | | | | | | | | | | | | | | | *Eastern Districts.* |
| ... | ... | 22 10 | 22 10 | 21 0 | 100 0 | 100 0 | 100 0 | 9 0 | 9 0 | 8 11 | 5 0 to 6 0 | 5 0 to 6 0 | 5 0 to 6 0 | 6 0 to 7 0 | 5 0 to 6 0 | 6 0 to 7 0 | 8 0 to 30 0 | 8 0 to 15 0 | 8 0 to 20 0 | Dacca. |
| ... | ... | 16 0 | 18 0 | 20 0 | ... | ... | ... | 9 0 | 9 0 | 8 0 | 5 0 | 5 0 | 5 0 | 6 0 | 6 0 | 6 0 | 10 0 to 12 0 | 10 0 to 12 0 | 10 0 to 12 0 | Furreedpore. |
| ... | ... | 16 0 | 16 0 | 21 0 | 100 0 | 100 0 | 100 0 | 8 8 | 8 8 | 8 8 | 7 8 | 7 8 | 7 8 | 6 0 | 6 0 | 6 0 | 8 0 to 14 0 | 8 0 to 14 0 | 8 0 to 14 0 | Backergunge. |
| ... | ... | 14 0 | 14 0 | 18 8 | ... | ... | ... | 8 12 | 8 12 | 8 8 | 6 0 to 7 0 | 7 8 | 7 8 | 6 0 | 6 0 | 6 0 | 12 0 to 25 0 | 10 0 to 25 0 | 10 0 to 25 0 | Mymensingh. |

Pay of able-bodied laborer who carries loads in the bazar is Rs. 6-8.
In the interior the prices range as follow :—Wheat 16 to 20 seers, best rice 15 to 16 seers, common rice 20 to 24 seers, and gram 22-8 seers.
In Serajgunge the prices are as follow :—Wheat 16 seers, best rice 11 seers, common rice 20 seers, and gram 22 seers.
In the interior the prices range as follow :—Wheat 8 to 10 seers, best rice 8 to 12 seers, common rice 10 to 20 seers, Indian corn 16 to 40 seers, and gram 13 to 20 seers.
In the interior the prices range as follow :—Wheat 9 to 30 seers, best rice 7 to 13 seers, common rice 12 to 21-5 seers, and gram 10 to 16 seers.
In the interior the prices range as follow :—Best rice 15 to 16 seers, and common rice 18 to 19 seers.
In the interior the prices range as follow :—Best rice 10 to 14 seers, common rice 13 to 18 seers, and gram 16 to 20 seers.
In the interior the prices range as follow :—Best rice 13-8 to 15 seers, common rice 13-8 to 16 seers, paddy 27 to 31 seers, and gram 12 seers.
In the interior the prices range as follow :—Wheat 13 to 18 seers, best rice 12-8 to 21 seers, common rice 18 to 28 seers, and gram 10 to 17 seers.

## *PRICES-CURRENT of Food-grains and Salt in the undermentio*

QUANTITIES PER RUPEE

| DISTRICTS. | WHEAT. | | | BARLEY. | | | RICE, BEST SORT. | | | RICE, COMMON. | | | BULRUSH MILLET—CUMBOO, BAJRA. | | | GREAT MILLET—CHOLUM, JOWAR. | | | LESSER MILLETS—RAGI OR MUR AND CHENA. | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Present return. | Next preceding return. | Corresponding return of last year. | Present return. | Next preceding return. | Corresponding return of last year. | Present return. | Next preceding return. | Corresponding return of last year. | Present return. | Next preceding return. | Corresponding return of last year. | Present return. | Next preceding return. | Corresponding return of last year. | Present return. | Next preceding return. | Corresponding return of last year. | Present return. | Next preceding return. | Corresponding return. |
| *Eastern Districts*—(Contd.) | S. Ch. | S. Ch. | S. Ch. | S. Ch. | S. Ch. | S. Ch. | S. Ch. | S. Ch. | S. Ch. | S. Ch. | S. Ch. | S. Ch. | S. Ch. | S. Ch. | S. Ch. | S. Ch. | S. Ch. | S. Ch. | S. Ch. | S. Ch. | |
| Chittagong ... | Q 8 0 | 8 0 | 13 0 | ... | ... | ... | 6 0 | 7 0 | 12 0 | 12 0 | 13 0 | 14 0 | ... | ... | ... | ... | ... | ... | ... | ... | |
| Noakholly ... | R ... | ... | ... | ... | ... | ... | 10 0 | 10 0 | 11 0 | 17 0 | 14 0 | 17 0 | ... | ... | ... | ... | ... | ... | ... | ... | |
| Tipperah ... | 12 8 | 11 8 | 14 0 | ... | ... | ... | 13 0 | 13 0 | 13 0 | 17 0 | 17 0 | 19 0 | ... | ... | ... | ... | ... | ... | ... | ... | |
| Chittagong Hill Tracts. | ... | ... | ... | ... | ... | ... | 8 10 | 8 0 | 11 8 | 9 0 | 8 14 | 12 4 | ... | ... | ... | ... | ... | ... | ... | ... | |
| Hill Tipperah ... | 10 6 | 10 6 | 9 3 | ... | ... | ... | 16 0 | 15 0 | 14 0 | 22 0 | 20 0 | 19 0 | ... | ... | ... | ... | ... | ... | ... | ... | |
| BEHAR. | | | | | | | | | | | | | | | | | | | | | |
| Patna ... | 20 0 | 20 0 | 23 0 | 30 0 | 35 0 | 35 0 | 13 8 | 14 0 | 13 0 | 15 8 | 18 0 | 20 0 | ... | ... | ... | 27 0 | 27 0 | 30 0 | ... | ... | |
| Gya ... | S 22 0 | 24 0 | 21 0 | 36 0 | 37 0 | 27 0 | 12 0 | 13 0 | 10 8 | 19 0 | 21 0 | 20 0 | ... | ... | ... | ... | ... | ... | ... | ... | |
| Shahabad ... | T 19 8 | 21 0 | 21 8 | 30 0 | 30 0 | 26 0 | 15 0 | 16 0 | 16 0 | 17 0 | 17 8 | 19 0 | ... | ... | ... | ... | ... | ... | 31 0 | 32 0 | |
| Durbhunga ... | U 17 8 | 20 0 | 17 8 | 28 8 | 28 8 | 28 8 | 12 4 | 13 8 | 13 0 | 14 12 | 15 4 | 15 12 | ... | ... | ... | ... | ... | ... | 25 4 | 26 4 | |
| Mozufferpore | V 20 0 | 19 0 | 19 0 | 25 0 | 25 0 | 27 8 | 10 0 | 10 0 | 12 0 | 14 0 | 14 0 | 14 0 | ... | ... | ... | ... | ... | ... | ... | ... | |
| Sarun ... | 16 12 | 17 0 | 22 0 | 28 0 | 29 0 | 30 0 | 10 0 | 10 0 | 9 12 | 17 8 | 18 0 | 19 0 | ... | ... | ... | 29 0 | 31 0 | ... | 28 0 | 29 0 | |
| Chumparun ... | W 22 0 | 19 0 | 23 0 | 34 0 | 36 0 | 34 0 | 9 0 | 9 0 | 8 0 | 15 0 | 15 0 | 19 8 | ... | ... | ... | ... | ... | ... | ... | ... | |
| Monghyr ... | 21 0 | 19 9 | 24 1 | 31 5 | 26 2 | 35 7 | 14 7 | 13 6 | 15 7 | 16 8 | 16 8 | 17 8 | ... | ... | ... | ... | ... | ... | ... | ... | |
| Bhagulpore ... | X 15 2 | 17 11 | 19 14 | 30 6 | 35 5½ | 32 15 | 13 14 | 13 14 | 13 2 | 15 2 | 13 15 | 19 9 | ... | ... | ... | ... | ... | ... | ... | ... | |
| Purneah ... | Y 19 0 to 25 0 | 20 0 to 25 0 | 26 0 | ... | ... | ... | 19 0 to 20 0 | 20 0 | 16 0 | 24 0 | 24 0 | 18 0 | ... | ... | ... | ... | ... | ... | ... | ... | |
| Maldah ... | 19 0 | 19 0 | 22 0 | 40 0 | 40 0 | 40 0 | 17 8 | 20 0 | 19 0 | 18 8 | 21 0 | 22 0 | 30 0 | 30 0 | 32 0 | ... | ... | ... | ... | ... | |
| Sonthal Pergha... | Z 14 0 | 13 0 | 20 0 | ... | ... | ... | 16 0 | 17 0 | 19 8 | 20 0 | 20 0 | 22 0 | ... | ... | 40 0 | ... | ... | ... | ... | ... | |
| ORISSA. | | | | | | | | | | | | | | | | | | | | | |
| Cuttack ... | 13 2 | 13 2 | 21 0 | ... | ... | ... | 10 8 | 14 7 | 17 1 | 11 13* | 17 1 | 26 4 | ... | ... | ... | ... | ... | ... | 21 0 | 21 0 | |
| Pooree ... | 13 2 | 14 7 | 17 1 | ... | ... | ... | 41 13 | 11 13 | 17 1 | 15 12 | 15 1 | 21 0 | ... | ... | ... | ... | ... | ... | ... | ... | |
| Balasore ... | 14 0 | 16 0 | 18 0 | ... | ... | ... | 14 0 | 18 0 | 21 0 | 21 0 | 25 0 | 29 0 | ... | ... | ... | ... | ... | ... | ... | ... | |
| CHOTA NAGPORE. | | | | | | | | | | | | | | | | | | | | | |
| *South-Western Frontier Agency.* | | | | | | | | | | | | | | | | | | | | | |
| Hazareebagh ... | Z1 20 8 | 20 0 | 17 8 | ... | ... | ... | 12 0 | 13 0 | 13 0 | 21 0 | 22 8 | 20 0 | ... | ... | ... | ... | ... | ... | 33 0 | 33 0 | |
| Lohardugga ... | Z3 20 0 | 20 0 | 18 0 | 32 0 | 36 0 | ... | 24 0 | 24 0 | 22 0 | 27 0 | 32 0 | 26 0 | ... | ... | ... | ... | ... | ... | 38 0 | 40 0 | |
| Singbhoom ... | 26 0 | 26 0 | 26 0 | 40 0 | 40 0 | 32 0 | 20 0 | 20 0 | 18 0 | 40 0 | 40 0 | 36 0 | ... | ... | ... | ... | ... | ... | ... | ... | |
| Manbhoom ... | Z3 17 8 | 18 0 | 17 0 | 28 0 | 26 0 | 30 0 | 18 0 | 20 0 | 16 0 | 25 0 | 28 0 | 22 0 | ... | ... | ... | ... | ... | ... | 64 0 | 64 0 | |

* In Jajpore rice is procurable at 31 seers and 8 chuttacks per rupee, and in Kendrapara at 28 seers and 14 chuttacks.

Q In the interior the prices range as follow :—Best rice 5 to 10 seers, and common rice 7 to 12 seers.

R In the interior the prices range as follow :—Best rice 11 to 15 seers, and common rice 10 to 18 seers.

S In the interior the prices range as follow :—Wheat 20 to 27 seers, barley 35 to 37-8 seers, best rice 11-4 seers, common rice 17-8 to 21-8 seers, and gram 26 to 36 s

T In the interior the prices range as follow :—Wheat 18 to 21-8 seers, barley 27 to 38 seers, best rice 11 to 13 seers, common rice 18 seers, and gram 30 to 37-8 seers.

U In the interior the prices range as follow :—Wheat 18 to 20 seers, barley 25 to 30 seers, best rice 11 to 14-8 seers, common rice 15-8 to 16 seers, murwa 26 to 27 s maize 20 seers, and gram 20 to 27 seers.

V In the interior the prices range as follow :—Wheat 19 to 32-8 seers, barley 28 to 47 seers, best rice 12 to 22-12 seers, common rice 14-8 to 23-8 seers, lesser m 21 to 40 seers, maize 18 to 40 seers, and gram 25 to 50 seers.

W In the interior the prices range as follow :—Wheat 21 to 25 seers, barley 28 to 35 seers, best rice 13 to 15-8 seers, common rice 15 to 18 seers, lesser millets 45 seers, maize 25 to 41 seers, and gram 21 to 35 seers.

CALCUTTA

*...icts of Bengal for the Fortnight ending 15th July 1877.*—(Continued.)

...ER OF 80 TOLAHS.

AVERAGE WAGES PER MONTH.

| ...E OR INDIAN-CORN. | | GRAM. | | | FIREWOOD | | | SALT. | | | ABLE-BODIED AGRICULTURAL LABOURER. | | | SYCE OR HORSE-KEEPER. | | | COMMON MASON, CARPENTER, OR BLACKSMITH. | | | DISTRICTS. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Next preceding return. | Corresponding return of last year. | Present return. | Next preceding return. | Corresponding return of last year. | Present return. | Next preceding return. | Corresponding return of last year. | Present return. | Next preceding return. | Corresponding return of last year. | Present return. | Next preceding return. | Corresponding return of last year. | Present return. | Next preceding return. | Corresponding return of last year. | Present return. | Next preceding return. | Corresponding return of last year. | |
| | | | | | | | | | | | | | | | | | | | | *Eastern Districts.*—(Contd.) |
| S. Ch. | S. Ch. | S. Ch. | S. Ch. | S. Ch. | S. Ch. | S. Ch. | S. Ch. | S. Ch. | S. Ch. | S. Ch. | Rs. A. | Rs. A. | Rs. A. | Rs. A. | Rs. A. | Rs. A. | Rs. A. | Rs. A. | Rs. A. | |
| ... | ... | 13 0 | 13 8 | 14 0 | 120 0 | 120 0 | 120 0 | 7 4 | 7 4 | 7 8 | 7 8 to 9 0 | 8 0 to 9 0 | 8 0 to 10 0 | 6 0 to 7 8 | 6 0 to 8 0 | 6 0 to 8 0 | 9 0 to 15 0 | 10 0 to 12 0 | 9 0 to 20 0 | Chittagong. |
| ... | ... | 12 0 | 11 0 | 11 0 | ... | ... | ... | 7 8 | 7 8 | 6 8 | 6 0 to 15 0 | 11 0 to 20 0 | 9 8 to 10 0 | 6 0 to 7 8 | 6 0 to 12 0 | 6 0 to 5 0 | 7 8 to 15 0 | 12 0 to 20 0 | 5 0 to 10 0 | Noakholly. |
| ... | ... | 13 8 | 13 8 | 18 0 | ... | ... | ... | 9 0 | 9 0 | 8 8 | 6 0 to 8 8 | 7 0 | 6 0 | 6 0 to 8 0 | 6 0 to 8 0 | 6 0 | 8 0 to 15 0 | 8 0 to 15 0 | 8 0 to 15 0 | Tipperah. |
| ... | ... | ... | ... | ... | 240 0 | 240 0 | 240 0 | 6 6 | 6 10 | 5 11 | ... | ... | ... | ... | ... | ... | ... | ... | ... | Chittagong Hill Tracts. |
| ... | ... | 12 0 | 12 0 | 10 7 | ... | ... | ... | 8 0 | 8 0 | 8 0 | 5 8 | 6 8 | 5 8 | 5 8 | 6 0 | 6 0 | 9 0 | 10 8 | 12 0 | Hill Tipperah. |
| | | | | | | | | | | | | | | | | | | | | BEHAR. |
| 30 0 | 31 0 | 27 0 | 30 0 | 31 0 | 140 0 | 140 0 | 150 0 | 8 0 | 8 0 | 8 0 | 3 0 to 4 0 | 3 0 to 4 0 | 3 0 to 4 0 | 4 0 to 5 0 | 4 0 to 5 0 | 4 0 to 5 0 | 5 10 to 7 8 | 5 10 to 7 8 | 5 10 to 7 8 | Patna. |
| ... | ... | 28 0 | 29 8 | 24 0 | 160 0 | 160 0 | 160 0 | 8 0 | 8 0 | 8 0 | 2 12 to 3 0 | 2 12 to 3 0 | 2 6 to 3 12 | 4 0 to 5 0 | 4 0 to 5 0 | 2 8 to 4 0 | 5 0 to 6 0 | 5 0 to 6 0 | 4 0 to 5 0 | Gya. |
| 30 0 | 27 0 | 29 0 | 31 0 | 29 0 | 160 0 | 160 0 | 180 0 | 8 12 | 8 12 | 8 8 | ... | ... | ... | ... | ... | ... | ... | ... | ... | Shahabad. |
| 25 4 | 25 4 | 23 0 | 26 4 | 25 4 | 176 0 | 176 0 | 160 0 | 6 12 | 6 12 | 7 4 | 3 12 | 3 0 | 3 12 | 3 0 to 5 0 | 3 0 to 5 0 | 3 0 to 5 0 | 5 8 to 7 8 | 4 0 to 6 0 | 5 10 to 7 8 | Durbhunga. |
| 25 0 | 31 4 | 33 0 | 24 0 | 25 0 | 140 0 | 140 0 | 140 0 | 7 4 | 7 8 | 7 8 | 4 0 to 5 0 | 4 0 to 5 0 | 4 0 to 5 0 | 3 0 to 4 0 | 3 0 to 4 0 | 3 0 to 4 0 | 4 0 to 6 0 | 4 0 to 6 0 | 4 0 to 6 4 | Muzufferpore. |
| 31 0 | 30 0 | 27 0 | 27 8 | 29 0 | 160 0 | 160 0 | 160 0 | 8 0 | 8 0 | 8 0 | 2 8 to 3 12 | 2 8 to 3 12 | 2 8 to 3 12 | 4 0 to 4 8 | 4 0 to 4 8 | 4 0 to 4 8 | 6 0 to 10 0 | 6 0 to 10 0 | 6 0 to 10 0 | Sarun. |
| 26 0 | 38 0 | 28 0 | 28 0 | 26 0 | ... | ... | ... | 7 12 | 7 8 | 7 8 | 2 13 | 2 13 | 2 13 | 4 0 | 4 0 | 4 0 | 5 0 | 5 0 | 5 0 | Champarun. |
| 29 4 | 31 5 | 29 3 | 26 2 | 31 5 | 126 0 | 126 0 | 147 0 | 8 4 | 8 4 | 8 4 | 3 0 | 3 0 | 3 0 | 3 0 | 3 0 | 3 0 | 5 10 to 7 8 | 5 10 to 7 8 | 5 10 to 7 8 | Monghyr. |
| ... | ... | 24 0 | 26 8 | 28 6 | 151 9 | 157 8 | 161 8 | 8 13 | 7 9 | 8 3 | 2 13 to 3 12 | 2 13 to 3 12 | 2 13 to 3 12 | 3 8 to 5 0 | 4 0 to 5 0 | 3 8 to 5 0 | 5 10 to 9 6 | 5 10 to 9 6 | 7 8 to 9 6 | Bhagulpore. |
| ... | ... | 24 0 to 26 8 | 26 8 to 29 0 | 26 0 | 160 0 | 160 0 | 160 0 | 7 8 | 7 8 | 7 8 | 4 12 | 4 12 | 4 12 | 3 0 to 5 0 | 3 0 to 5 0 | 3 0 to 4 0 | 4 8 to 10 0 | 4 8 to 10 0 | 4 8 to 10 0 | Purneah. |
| 40 8 | 40 0 | 24 0 | 25 0 | 35 0 | 140 0 | 160 0 | 140 0 | 8 4 | 8 4 | 8 4 | 5 0 | 6 0 | 5 0 | 4 0 | 5 0 | 5 0 | 8 0 to 10 0 | 7 8 to 8 8 | 8 0 to 12 0 | Maldah. |
| ... | 40 0 | 24 0 | 24 0 | 32 0 | 240 0 | 240 0 | 240 0 | 8 0 | 8 0 | 8 0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | Sonthal Pergha. |
| | | | | | | | | | | | | | | | | | | | | ORISSA. |
| ... | ... | 17 1 | 17 1 | 27 9 | 200 0 | 200 0 | 200 0 | 12 0 | 12 0 | 13 0 | 5 10 | 5 10 | 5 10 | 4 0 | 4 0 | 4 0 | 7 8 to 10 0 | 7 8 to 10 0 | 7 8 to 10 0 | Cuttack. |
| ... | ... | 14 7 | 15 12 | 17 1 | 100 0 | 105 0 | 100 0 | 11 6 | 13 2 | 11 13 | 6 0 | 3 0 | 3 0 | 5 0 | 5 0 | 5 0 | 8 0 to 10 0 | 8 0 | 8 0 | Pooree. |
| ... | ... | 8 0 | 11 0 | 12 0 | 120 0 | 160 0 | 140 0 | 6 8 | 8 0 | 9 4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | Balasore. |
| | | | | | | | | | | | | | | | | | | | | CHOTA NAGPORE. |
| | | | | | | | | | | | | | | | | | | | | *South-Western Frontier Agency.* |
| ... | 24 8 | 26 8 | 28 0 | 18 8 | 240 0 | 240 0 | 240 0 | 8 0 | 7 0 | 7 0 | 4 0 | 4 0 | 4 0 | 5 0 | 5 0 | 5 0 | 8 0 | 8 0 | 8 0 | Hazareebagh. |
| ... | ... | 22 0 | 22 0 | 18 0 | 170 0 | 180 0 | 180 0 | 6 12 | 6 12 | 6 0 | 3 0 | 3 8 | 3 0 | 3 0 to 5 0 | 3 0 to 5 0 | 3 0 to 5 0 | 5 0 to 10 0 | 5 0 to 12 0 | 5 0 to 12 0 | Lohardugga. |
| ... | ... | 24 0 | 24 0 | 20 0 | 320 0 | 320 0 | 320 0 | 6 0 | 6 0 | 6 0 | ... | ... | ... | ... | ... | ... | ... | ... | ... | Singbhoom. |
| 40 0 | ... | 20 0 | 20 0 | 19 0 | 160 0 | 160 0 | 240 0 | 8 0 | 8 0 | 7 8 | 3 8 | 3 8 | 3 8 | 5 0 | 5 0 | 5 0 | 7 8 | 7 8 | 7 8 | Manbhoom. |

In the interior the prices range as follow :—Wheat 21 to 25 seers, barley 35 seers, best rice 18 to 19 seers, common rice 19 to 22 seers, murwa 40 seers, and gram 25 to 27 seers.

In the interior the prices range as follow :—Wheat 19 to 27 seers, best rice 18 to 20 seers, common rice 24 seers, and gram 24 to 30 seers.

In the interior the prices range as follow :—Wheat 20 to 24 seers, best rice 15 to 21-4 seers, common rice 19-12 to 24 seers, maize or Indian-corn 16 to 25 seers, and gram 25 to 32-8 seers.

In the interior the prices range as follow :—Wheat 19 to 24 seers, barley 26 to 40 seers, best rice 12 seers, common rice 18 to 23-8 seers, lesser millets 30 to 40 seers maize or Indian-corn 23 to 32-8 seers, and gram 21 to 35 seers.

In Daltongunge, the head-quarters of the Palamow sub-division, the prices on the 12th instant were as follow :—Wheat 25 seers, best rice 18 seers, and common rice 23-8 seers.

In the interior the prices range as follow :—Wheat 13 to 20 seers, best rice 18 to 30 seers, common rice 20 to 32 seers, and gram 16 to 21 seers.

Published for general information.

A. MACKENZIE,
*Offg. Secy. to the Govt. of Bengal.*

## Rainfall, Weather, and State and Prospects of the Crops.

*Statement showing Rainfall, Weather, and State and Prospects of the Crops in the different District of Bengal, as reported to Government during the week ending the 21st July 1877.*

| No. | District, and date of return. | Rainfall at Sudder Station in inches. | Character of the weather, state and prospects of the crops, and state of health at date. |
|---|---|---|---|
| | **BENGAL.** | | |
| | *Western Districts.* | | |
| 1 | Burdwan,* July 23* '77 | 3·78 | The rainfall at Culna has been 1·82 inches, at Cutwa ·75 of an inch, at Bood-Bood 1·11 inches, at Jehanabad 3·44 inches, and at Raneegunge 3·51 inches. The transplantation of *amun* seedlings was retarded for want of sufficient rain, and owing to this and to continued export the price of rice is still rising. |
| 2 | Bankoora, „ *21 „ | 3·19 | General rain has fallen. It was heavy towards the end of the week. Transplantation is being carried on with vigour. Prospects are good. Indigo manufacture has commenced. |
| 3 | Beerbhoom, „ 21 „ | 3·68 | Weather—Fair at the beginning of the week; plentiful rain at the end of it. The crops that were backward have now recovered, and the prospects are good. |
| 4 | Midnapore, „ 21 „ | ·30 | The sun has scarcely been visible during the week, but the showers have not been frequent or heavy. The weather is generally considered favourable. *Aous* rice is very promising; *amun* rice is also doing well. The indigo crop is reported to be a little deteriorated. |
| 5 | Hooghly, „ 21 „ | 2·59 | Weather—Warm and sultry in the first part of the week, cloudy in the latter part. Heavy rain since Friday night. The transplantation of late rice is going on. All the crops on the ground are doing well. The reaping of indigo has commenced. Public health is normal. Cattle disease prevails in two villages in thana Bullagur. |
| | Howrah, „ 21 „ | 1·90 | Rain throughout the district. Transplantation of late rice has commenced. |
| | *Central Districts.* | | |
| 6 | 24-Pergunnahs, July 23† '77 | 5·19 | Weather—Rainy and cloud. The transplantation of *amun* rice is going on. Public health is generally good. |
| 7 | Nuddea, „ 21 „ | 5·41 | Little rain in the early part of the week; it was rather heavy towards the end. The rice crops are most promising, and the weather has been all that could be desired for them. The outturn of indigo is not likely to be more than moderate. The prices of food-grains are rising. |
| 8 | Jessore, „ 21 „ | ·77 | Weather—Bright in the first part of the week; cloudy and rainy in the last part. State and prospects of the crops are favourable, but more rain is wanted. |
| 9 | Moorshedabad, „ 21 „ | 1·84 | Weather—Close and cloudy. The rain has still been far from sufficient for *amun* rice in the north and west of the district. But the prospects in the eastern part are good. |
| 10 | Dinagepore, „ 20 „ | 2·99 | Rain commenced on the evening of the 17th instant; 1·56 inches registered at Roygunge. No harm has been done by its holding off so long. State and prospects of the crops are all good. |
| 11 | Rajshahye, „ 21 „ | ·68 | There has been slight rain in all parts of the district in the middle of the week. The fall in Nattore was more than in Beauleah. The prospects of the autumn and winter rice crops are good, but in parts of the district the *dhan* which was grown in the low lands has been submerged on account of the late heavy rain, though it is believed that not much damage has ensued. The transplantation of *ropa dhan* has now commenced, and more rain is required for it. Jute is being reaped in parts of the district. |
| 12 | Rungpore, „ 20 „ | 1·02 | Weather—Hot and sultry during the first half of the week; but since the heavy showers on the night of the 17th instant the weather has cooled down. The sky during the last two days has been dark and gloomy with slight drizzling rain. 4·51 inches registered at Kurigram and 2·59 inches at Gaibanda. The state and prospects of the crops are favourable. The recent rain has been of much service for the transplantation of *amun* seedlings, which previously had been delayed for want of rain. |
| 13 | Bogra, „ 21 „ | 2·06 | Weather—Cloudy. *Aous* rice, jute, and sesamum, are being cut, and will probably yield a good outturn. |
| 14 | Pubna, „ 21 „ | ·86 | Weather—Seasonable; cloudy and showery. State and prospects of the crops are favourable. Cholera has entirely disappeared, but fever is rather prevalent. |

Burdwan Div. | Presidency Div. | Rajshahye and Cooch Behar Div.

* Telegram of the 23rd July shows rainfall during the seven days immediately preceding.

† Report of the 23rd July shows rainfall during the seven days immediately preceding.

| No. | District, and date of return. | Rainfall at Sudder Station in inches. | Character of the weather, state and prospects of the crops, and state of health at date. |
|---|---|---|---|
| **BENGAL.—(*Continued.*)** | | | |
| | *Central Districts.* | | |
| Rajshahye and Cooch Behar Divn. 15 | Darjeeling, July 20 '77 | 14·75 | The rainfall has been very considerable during the week. It was especially heavy on the 15th instant, and on the night of the 18th. The rice crops throughout the district are doing well. Some apprehensions were felt from the want of rain during the previous week, but it has been raining both in the plains and hills ever since the 14th. |
| 16 | Julpigoree, „ 21 „ | 13·34 | Very heavy rain has fallen, causing a rapid and at one time alarming rise in the river Teesta. The water is now slowly subsiding. The temperature is much cooler, being 5 or 6 degrees below the average. The reports from all thanas are favourable. The late rain has facilitated the transplanting of *haimanti* rice. *Bhadoi* crop is being reaped all over the district. The prospects of jute and sugarcane are good. |
| | Cooch Behar, „ 19 „ | 3·90 | The first six days of the week were very hot, with little or no rain. A heavy fall of rain on the 18th instant, succeeded by cloudy and windy weather, has quite changed the climate and the temperature for the time being. The weather looks like more rain ·55 of an inch of rainfall reported from Dinhatta, ·30 of an inch from Mathabhanga, and ·17 of an inch from Mekligunge. The rain of the 18th, succeeded by another fall since, has made matters look much brighter. If the rain continue in proportion all fears of general failure will be removed. *Bitri dhan* will not however be a good crop, nor can it be expected that *aman dhan* will be more than an average crop. There are general complaints that the *bitri*, which is being reaped, is light in the ear, although yielding an abundance of straw. The prospects towards the south of the state in the Dinhatta sub-division seem to be better than elsewhere. Cattle disease has made its appearance, and is spreading. The public health is good. |
| | *Eastern Districts.* | | |
| Dacca Divn. 17 | Dacca, July 23*'77 | 10·02 | There has been rain every day during the week. The crops are favourable, and the prices are lower. The rain will do much good to the highland jute. |
| 18 | Furreedpore, „ 21 „ | ·70 | Weather—Seasonable; occasionally very sultry between the showers 2·63 inches of rain registered at Madaripore. The prospects of the rice, sugarcane, and jute crops, are favourable. |
| 19 | Backergunge, „ 19 „ | 4·12 | Weather—Rainy and on the whole favourable to agricultural operations. The ploughing for *aman* is progressing briskly even in the tracts devastated by the storm-waves of the 31st October last. The prospects of *aous* still continue to be favourable. The district generally is healthier than it has been this year, and cholera even in a sporadic form has disappeared. The general health of the cattle is good. |
| 20 | Mymensingh, „ 20 „ | 4·74 | Weather—Rainy. State and prospects of the crops are fair, but more rain is wanted. |
| 21 | Tipperah, „ 20 „ | 7·41 | A good quantity of rain has fallen all over the district except in the north. 1·10 inches registered at Brahmunbariah. The rice crops are in good condition except in the north of the district, where more rain is wanted. |
| Chittagong Divn. 22 | Chittagong, ... ... | ..... | Return not received. |
| 23 | Noakholly, ... ... | ..... | Return not received. |
| 24 | Chittagong Hill Tracts, „ 17 „ | 4·61 | Weather—Seasonable. Paddy is in flower in some *jooms*. Cotton plants are thriving well. Prospects are fair. Owing to the scarcity of food prevailing here many hillmen have not been able to cut *joom* because they had to search for yams and roots for their subsistence. Land is being prepared for the late rice crop. |
| | Hill Tipperah, „ 18 „ | 2·14 | Heavy and continuous rainfall, which was apparently general. Late rice is being rapidly transplanted. The weather has been also favourable for *jooming* in the hills. |
| **BEHAR.** | | | |
| Patna Divn. 25 | Patna, July 23*'77 | 3·12 | Weather—Hot and close, with occasional fall of rain, which has enabled the cultivators to prepare land for *bhadoi* sowings. Much more rain is however wanted. Health of the district is generally good. |
| 26 | Gya, „ 21 „ | 1·18 | Weather—Cloudy, and cool winds prevailed from the south and west. The thermometre reached 98·6° in the shade. 2·02 inches of rain registered at Jehanabad, ·22 of an inch at Aurungabad, and ·2 of an inch at Nowada. Unless there be good general rain in a week, the prospects will be decidedly bad. Rain is wanted by all crops, and in order to kill off the grasshoppers, which are still doing much damage. Second growings are being made in places where these insects had destroyed the plants. The reports from thanas Nabbinaggur and Aurungabad especially are unfavourable. |
| 27 | Shahabad, „ 21 „ | ·80 | Weather—Cloudy and hot. The ·80 of an inch of rainfall at the Sudder Station represents the light showers on Thursday and Friday. Similar rain is reported from Buxar on the 12th, 13th, 14th, and 17th instant, amounting to a total fall of 1·04 inches. Rain is still wanted. Flights of locusts and insects have done some injury to the sugarcane crop in places. |

* Telegrams of the 23rd July show rainfall during the seven days immediately preceding.

| No. | District and date of return. | Rainfall at Sudder Station in inches. | Character of the weather, state and prospects of the crops, and state of health at date. |
|---|---|---|---|
| | **BEHAR.—(*Continued.*)** | | |
| **PATNA DIVN.** 28 | Durbhunga, July 21 '77 | 8·55 | The unsatisfactory prospects with which the week began have ceased with the heavy rain, which has fallen all over the district. The rain (8¼ inches at head-quarters) has been nearest in the centre and south of the district, where it was most wanted For indigo indeed it comes somewhat late; but for the *bhadoi* and *aghani* food crops it has come most opportunely. The downpour has not only relieved these crops, but has checked sickness, reducing cholera to a minimum. At present therefore the outlook is satisfactory. |
| 29 | Mozufferpore, „ 21 „ | 3·14 | Weather—Cool and cloudy. During the latter half of the week good rain has fallen throughout the Mozufferpore sub-division, varying from 2 to 3 inches. The rice seedlings are being transplanted vigorously, and the empty *bhadoi* lands are being sown or re-sown. Another such fall of rain within a few days is required. At Hajeepore 1·34 inches of rain have fallen, and the prospects of all crops are good. At Seetamurhee the fall has been 4·12 inches, and in thana Poopree, where rain was especially wanted, 4·50 inches. Transplantation is going on very actively. In the north-west some damage has been done to indigo and maize by locusts. |
| 30 | Sarun, „ 21 „ | 1·57 | Weather—Close and cloudy, with very heavy atmosphere. There have been one or two sharp showers, but heavier rain is hoped for. 1·09 inches of rain registered at Sewan, and there has been some in most other parts of the district, but heavy rain is wanted everywhere, and the crops are suffering from the delay. The transplantation of *aghani* rice is at a standstill, and the seedlings in the nurseries are looking sickly. |
| 31 | Chumparun, „ 21 „ | ·53* | West winds prevailed during the greater part of the week. Heavy rain has fallen since the 18th instant throughout the district. Should it continue the prospects will be very good. The rain has been of the greatest benefit. Cholera is abating. |
| **BHAGULPORE DIVN.** 32 | Monghyr, „ 21 „ | 4·46 | Weather—Rain now prevailing, but only for the last three days. ·75 of an inch registered at Jamui. Ploughing has commenced, and there is now no fear at all for the crops. |
| 33 | Bhagulpore, „ 23† „ | 8·50 | Weather—Seasonable. In all the sub-divisions the rainfall has been sufficient, and the prospects of the crops are good, except in pergunnah Naradigur, in the Soopole sub-division, where the *bhadoi* crop is said to be permanently injured, and but little *aghani* is yet established. |
| 34 | Purneah, „ 21 „ | 5·69 | Weather—Seasonable for the last three days. There was heavy rain on Thursday, which has enabled the villagers to plant out the late rice. 4·65 inches registered at Arrareah, and 2·95 inches at Kissengunge. The rivers are rising. The early *bhadoi* crop has been damaged by want of rain. |
| 35 | Maldah, „ 21 „ | 2·19 | Moderate rain has fallen in almost every part of the district. The broadcast *dhan* in the western half of the district has been well weeded, looks very well, and unless destroyed by very sudden inundation, will do well. For the *ropa dhan* on the higher land to the north-east of the district very heavy rain is required before the 10th of August. |
| 36 | Sonthal Pergha. „ 22 „ | 4·14 | The rainfall of the week has been general over the district. 3·11 inches registered at Deoghur, 2·60 inches at Godda, and 3·6 inches at Rajmehal. State and prospects of the crops are good. The *janera* crop has been favoured by the late warm and bright weather. The rice planting has been saved by the rain of the last few days. |
| | **ORISSA.** | | |
| **ORISSA DIVN.** 37 | Cuttack, July 21 '77 | ·18 | Weather—Clear and hot; now and then cloudy and stormy with slight rain. An extraordinary high flood in the Bytarni and Brahminy rivers on the 13th and 15th instant has breached several bunds, canal embankments, and the Trunk Road, causing much damage. The crops in some parts of the Kendrapara and Jajpore sub-divisions were submerged, but no permanent loss is anticipated. The crops in the other parts of the district are in good condition, but rain is required. Public health is fairly good. Only a few cases of cholera are being reported. |
| 38 | Pooree ... ... ... | ..... | Return not received. |
| 39 | Balasore, „ 20 „ | 4·06 | At head-quarters the heavy rain ceased on the 13th instant, and there has been very little since. The Burabulang river has returned to its natural bed. The Bytarni and Salandi rivers rose very high on the 13th and 14th. The flood in the former was unprecedented since 1868, and has done much damage to the embankments, the Trunk Road, and the high level canal, all of which are reported to be breached in many places. The crops are too young to suffer from temporary inundation, and their condition is very promising. Public health is good. |

* 4·23 inches of rain up to noon of Tuesday.

† Telegram of the 23rd July shows rainfall during the seven days immediately preceding.

| No. | District, and date of return. | Rainfall at Sudder Station in inches. | Character of the weather, state and prospects of the crops, and state of health at date. |
|---|---|---|---|
| CHOTA NAGPORE. | | | |
| | *South-West Frontier Agency.* | | |
| 40 | Hazareebagh, July 20 '77 | 3·21 | Weather—Unseasonable; variable with alternate sunshine and wet, the former predominating. The prospects have improved by the rainfall of the week, but much more rain is required to fill the terraced field and enable the ryots to plant out their rice. The sowings in general are all backward. |
| 41 | Lohardugga, „ 21 „ | 1·84 | Weather—Seasonable in the head-quarters sub-division, and the prospects of the crops are good. It is reported from the Palamow sub-division that good rain fell there on the 11th, 12th, and 13th instant, measuring 3·06 inches. Since then the weather is hot, clear, and dry with strong south-westerly wind. The highland crops are promising. *Makai*, *murwa*, *kado*, and *goondli* are all sown. *Dhan* is also sown, but the seedlings are now being parched up again. *Lewa* has been made, but the drying wind and scorching sun are drying it all up again. The *dhan* prospects are therefore not favourable. Health of the district is good. |
| 42 | Singbhoom „ 20 „ | 3·00 | Weather—Seasonable. The prospects of the crops could not possibly be better. The district is healthy. |
| 43 | Manbhoom „ 21 „ | 2·32 | Weather—Seasonable. On the 18th instant it was reported from Govindpore that rain was wanted there, but it must have fallen by this time. State and prospects of the crops are very promising. |

Published for general information.

CALCUTTA, STATISTICAL DEPT.,
*The 24th July* 1877.

A. MACKENZIE,
*Offg. Secy. to the Govt. of Bengal.*

## Weekly Report of Rainfall compiled at the Meteorological Reporter's Office.

| Divisions. | Districts. | Stations. | Rain from 1st to 7th July 1877. | Rain from 8th to 14th July 1877. | Rain from 1st January 1877. | | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | | | Inches. | Up to date. | |
| BENGAL. | | | Inches. | Inches. | | 1877. | |
| | Western Districts. | | | | | | |
| Burdwan | Burdwan ... ... | Burdwan ... ... | 0·97 | 2·20 | 19·64 | 14th July | |
| | | Cutwa ... ... | Not recd. | 3·56 | 26·46 | ditto | |
| | | Culna ... ... | 5·30 | 3·08 | 26·97 | ditto | |
| | | Bood-Bood ... ... | 2·38 | 3·61 | 18·22 | ditto | |
| | | Raneegunge ... ... | 0·81 | 3·99 | 18·44 | ditto | |
| | | Jehannabad ... ... | 3·56 | 5·96 | 35·52 | ditto | |
| | Bankoora ... ... | Bankoora ... ... | 0·69 | 4·27 | 19·69 | ditto | |
| | Beerbhoom ... ... | Sooree ... ... | 1·70 | 2·97 | 18·52 | ditto | |
| | | Hetampore ... ... | 1·43 | 2·02 | 20·51 | ditto | |
| | | Roypore ... ... | 2·61 | 0·78 | 18·23 | ditto | |
| | Midnapore ... ... | Midnapore ... ... | 0·76 | 2·47 | 27·67 | ditto | |
| | | Tumlook ... ... | 0·77 | 3·56 | 19·84 | ditto | |
| | | Ghattal ... ... | 2·43 | 10·01 | 32·59 | ditto | |
| | | Contai { Dy. Collr.'s Office... | 2·13 | 8·29 | 39·05 | ditto | |
| | | Contai { Exe. Engr.'s Office | 1·57 | Not recd. | 22·86 | 7th July | |
| | Hooghly ... ... | Hooghly ... ... | 4·68 | 1·57 | 27·65 | 14th July | |
| | | Serampore ... ... | 3·89 | 2·13 | 26·45 | ditto | |
| | Howrah ... ... | Howrah ... ... | 3·00 | 2·82 | 25·76 | ditto | |
| | | Maheshrekha ... | 2·66 | Not recd. | 21·53 | 7th July | |
| | Central Districts. | | | | | | |
| Presidency. | 24-Pergunnahs ... | Saugor Island ... ... | 1·40 | 11·90 | 38·94 | 14th July | |
| | | Calcutta ... ... | 2·76 | 3·10 | 24·11 | ditto | |
| | | Alipore { Dispensary ... | 3·63 | 3·74 | 27·52 | ditto | |
| | | Alipore { Jail ... | 3·51 | 3·58 | 26·85 | ditto | |
| | | Busseerhat ... ... | 4·30 | 4·22 | 31·75 | ditto | |
| | | Baraset ... ... | 2·83 | 3·21 | 27·23 | ditto | |
| | | Diamond Harbour ... | 1·94 | 4·46 | 38·23 | ditto | |
| | | Barripore ... ... | 2·68 | 5·57 | 30·20 | ditto | |
| | | Satkhira ... ... | 7·56 | 1·23 | 40·13 | ditto | |
| | | Barrackpore ... ... | 4·77 | 2·25 | 28·13 | ditto | |
| | | Dum-Dum ... ... | 4·15 | 1·72 | 22·26 | ditto | |
| | Nuddea ... ... | Kishnaghur ... ... | 12·72 | 2·84 | 39·05 | ditto | |
| | | Bongong ... ... | 14·02 | 2·76 | 37·22 | ditto | |
| | | Meherpore ... ... | 9·15 | 1·11 | 34·91 | ditto | |
| | | Chooadanga ... ... | 7·32 | 1·39 | 34·72 | ditto | |
| | | Kooshtea ... ... | 10·80 | 0·96 | 38·65 | ditto | |
| | | Ranaghat ... ... | 6·57 | 8·55 | 34·13 | ditto | |
| | Jessore ... ... | Jessore ... ... | 4·79 | 1·83 | 31·13 | ditto | |
| | | Narail ... ... | 8·28 | 1·81 | 29·60 | ditto | |
| | | Khoolna ... ... | 6·78 | 1·25 | 37·70 | ditto | |
| | | Jhenida ... ... | 3·69 | 0·54 | 28·57 | ditto | |
| | | Bagirhat ... ... | 10·90 | 1·90 | 50·36 | ditto | |
| | | Magoorah ... ... | 7·04 | 1·34 | 39·15 | ditto | |
| | Moorshedabad ... | Berhampore ... ... | 5·61 | 3·04 | 24·31 | ditto | |
| | | Rampore Haut ... ... | 2·11 | 3·12 | 20·50 | ditto | |
| | | Lallbagh ... ... | 8·77 | 3·33 | 27·98 | ditto | |
| | | Jungypore ... ... | 2·61 | 1·52 | 17·66 | ditto | |
| | | Azimgunge ... ... | 4·31 | 0·89 | 18·61 | ditto | |
| | | Lallgolla ... ... | 2·77 | 1·93 | 18·94 | ditto | |
| | | Kaudee ... ... | 5·13 | 5·36 | 26·26 | ditto | |
| Rajshahye. | Dinagepore ... ... | Dinagepore ... ... | 1·36 | 0·95 | 26·19 | ditto | |
| | | Raigange ... ... | 2·89 | 1·56 | 26·48 | ditto | |
| | Maldah ... ... | Maldah ... ... | 5·55 | 2·87 | 25·73 | ditto | |
| | | Chanchal ... ... | 3·29 | 3·10 | 23·01 | ditto | |
| | Rajshahye ... ... | Baulcah ... ... | 8·45 | 0·54 | 31·44 | ditto | |
| | | Nattore ... ... | 15·92 | 0·9 | 38·74 | ditto | |
| | Rungpore ... ... | Rungpore ... ... | 1·94 | 2·42 | 46·28 | ditto | |
| | | Bhabanigunge ... ... | 7·11 | 1·07 | 47·25 | ditto | |
| | | Kurigram ... ... | 5·49 | 1·51 | 39·73 | ditto | |
| | | Bagdogra ... ... | Not recorded. | | 24·08 | 2nd June | |
| | Bogra ... ... | Bogra ... ... | 8·08 | 1·29 | 30·88 | 14th July | |
| | | Sherpore ... ... | 4·61 | 1·41 | 27·04 | ditto | |
| | | Nowkhilla ... ... | 5·85 | 1·05 | 25·81 | ditto | |
| | | Panchbibi ... ... | 8·34 | 2·55 | 25·93 | ditto | |
| | | Halulya ... ... | 9·70 | 2·97 | 29·34 | ditto | |
| | Pubna ... ... | Pubna ... ... | 13·71 | 1·06 | 42·55 | ditto | |
| | | Serajgunge ... ... | 5·66 | 2·08 | 28·55 | ditto | |
| Cooch Behar. | Darjeeling ... ... | Darjeeling { Telegraph Office | 2·75 | Not recd. | 32·77 | 7th July | |
| | | Darjeeling { Hospital ... | 2·58 | 7·89 | 46·62 | 14th July | |
| | Julpigoree ... ... | Julpigoree ... ... | 2·74 | 0·05 | 41·10 | ditto | |
| | | Bodah ... ... | 4·07 | 0·20 | 32·61 | ditto | |
| | | Buxa—Civil Surgeon's Office | 9·45 | 0·79 | 90·96 | ditto | |
| | | Titalya ... ... | 2·80 | 0·98 | 38·28 | ditto | |
| | Cooch Behar Tributary States. | Cooch Behar ... ... | 4·75 | 1·28 | 46·58 | ditto | |

| Divisions. | Districts. | Stations. | Rain from 1st to 7th July 1877. | Rain from 8th to 14th July 1877. | Rain from 1st January 1877. | | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | | | Inches. | Up to date. | |
| BENGAL—(*Continued.*) | | | | | | | |
| | Eastern Districts. | | Inches. | Inches. | | 1877. | |
| Dacca. | Dacca ... ... | Dacca... { Telegraph Office... | 3·83 | Not recd. | 37·99 | 7th July | |
| | | Dacca... { Hospital ... | 3·43 | 2·28 | 43·88 | 14th July | |
| | | Moonsheegunge ... ... | 5·28 | 2·61 | 69·31 | ditto | |
| | | Manickgunge ... ... | 8·54 | 1·39 | 38·14 | ditto | |
| | Furreedpore ... ... | Furreedpore ... ... | 17·05 | 0·77 | 50·89 | ditto | |
| | | Goalundo ... ... | 9·73 | 0·49 | 37·31 | ditto | |
| | | Madaripore ... ... | 11·98 | 3·41 | 53·60 | ditto | |
| | Backergunge ... | Burrisal ... ... | 7·96 | 3·31 | 56·16 | ditto | |
| | | Perozepore ... ... | 17·67 | 1·59 | 59·86 | ditto | |
| | | Patooakhally ... ... | 8·56 | 3·93 | 58·47 | ditto | |
| | | Bhola ... ... | 9·63 | 6·19 | 54·71 | ditto .. | From 4th February 1877. |
| | Mymensingh ... | Mymensingh ... ... | 2·28 | 1·44 | 36·38 | ditto | |
| | | Jamalpore ... ... | 2·26 | 2·31 | 29·10 | ditto | |
| | | Atia ... ... | 4·33 | 3·92 | 37·71 | ditto | |
| | | Kisboregunge ... ... | 2·85 | 1·84 | 38·58 | ditto | |
| Chittagong. | Chittagong ... ... | Chittagong { Telegraph Office | 5·30 | 2·00 | 42·40 | ditto | |
| | | Chittagong { Jail ... | 4·91 | 1·03 | 38·05 | ditto | |
| | | Cox's Bazar ... ... | 11·65 | 4·13 | 58·70 | ditto | |
| | Noakholly ... ... | Noakholly ... ... | 6·06 | 3·84 | 54·32 | ditto | |
| | | Feuny ... ... | 3·67 | Not recd. | 54·37 | 7th July | |
| | Tipperah ... ... | Comillah ... ... | 4·03 | 4·63 | 50·12 | 14th July | |
| | | Brahmunbariah ... ... | 4·34 | 2·72 | 45·56 | ditto | |
| | Chittagong Hill Tracts | Rungamatee Hill ... | 3·20 | 2·60 | 38·91 | ditto | |
| | Hill Tipperah ... ... | Hill Tipperah ... ... | 3·09 | 1·07 | 40·11 | ditto | |
| BEHAR. | | | | | | | |
| Patna. | Patna ... ... | Patna ... ... | 4·44 | 0·86 | 14·01 | ditto | |
| | | Behar ... ... | 4·98 | 3·19 | 22·53 | ditto | |
| | | Barh ... ... | 7·06 | 0·71 | 20·33 | ditto | |
| | | Dinapore ... { Jail ... | 2·73 | Not recd. | 8·44 | 7th July | |
| | | Dinapore ... { Cantonment... | 2·73 | 0·89 | 9·13 | 14th July | |
| | Gya ... ... | Gya ... ... | 2·45 | 1·75 | 20·04 | ditto | |
| | | Nowadah ... ... | 5·65 | 1·64 | 21·81 | ditto ... | Not recorded 18th to 24th Feb. |
| | | Aurungabad ... ... | 1·72 | 1·61 | 16·32 | ditto ... | Ditto 12th Jan. and 4th to 10th February. |
| | | Jehanabad ... ... | 1·36 | 1·28 | 13·69 | ditto | |
| | Shahabad ... ... | Arrah ... ... | 3·75 | 1·72 | 17·22 | ditto | |
| | | Sasseram ... ... | 1·95 | Not recd. | 10·98 | 7th July | |
| | | Buxar ... ... | 2·14 | 1·28 | 11·29 | 14th July | |
| | | Bhuboosh ... ... | 1·70 | 1·62 | 11·63 | ditto | |
| | Mozufferpore... ... | Mozufferpore ... ... | 0·06 | 0·90 | 7·84 | ditto | |
| | | Hajeepore ... ... | 5·01 | 2·71 | 15·47 | ditto | |
| | | Seetamurhee ... ... | 1·79 | 0·83 | 12·82 | ditto | |
| | Durbhunga ... ... | Durbhunga ... ... | 2·21 | 0·89 | 12·58 | ditto | |
| | | Mudhoobunnee ... ... | 1·11 | 1·48 | 10·73 | ditto | |
| | | Tajpore ... ... | 2·90 | 0·70 | 10·19 | ditto | |
| | Sarun ... ... | Chupra ... ... | 2·53 | 2·74 | 14·16 | ditto | |
| | | Sewan ... ... | 4·38 | 1·70 | 18·07 | ditto | |
| | Chumparun ... ... | Motiharee ... ... | 0·54 | 0·85 | 10·35 | ditto | |
| | | Bettiah ... ... | 3·13 | 0·13 | 17·72 | ditto | |
| | | Segowlie ... ... | 1·70 | 0·32 | 15·72 | ditto | |
| Bhagulpore. | Monghyr ... ... | Monghyr ... ... | 1·44 | 0·94 | 13·06 | ditto | |
| | | Begoosarai ... ... | 5·46 | 1·05 | 14·60 | ditto | |
| | | Jamooee ... ... | 1·26 | 0·71 | 14·40 | ditto | |
| | Bhagulpore ... ... | Bhagulpore ... ... | 3·80 | 2·04 | 18·99 | ditto | |
| | | Soopool ... ... | 9·13 | 0·60 | 19·47 | ditto | |
| | | Muldehpoora ... ... | 2·60 | 1·80 | 14·99 | ditto | |
| | | Banka ... ... | 0·58 | 2·12 | 14·25 | ditto | |
| | | Sonbursa ... ... | 3·94 | 1·36 | 14·14 | ditto | |
| | Purneah ... ... | Purneah ... ... | 2·63 | 1·79 | 19·38 | ditto | |
| | | Kissengunge ... ... | 1·72 | 0·64 | 21·28 | ditto | |
| | | Arrareah ... ... | 1·46 | 0·13 | 17·46 | ditto | |
| | Southal Pergunnahs | Nya Doomka ... ... | 3·91 | 2·29 | 25·19 | ditto | |
| | | Rajmahal ... ... | 2·10 | 2·10 | 20·70 | ditto ... | Not recd. 17th to 23rd June. |
| | | Deoghur ... ... | Not recd. | 2·32 | 19·38 | ditto ... | Not recd. 1st to 7th July. |
| | | Godda ... ... | 0·98 | 2·26 | 13·78 | ditto | |

| Divisions. | Districts. | Stations. | Rain from 1st to 7th July 1877. | Rain from 8th to 14th July 1877. | Rain from 1st January 1877. | | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | | | Inches. | Up to date. | |
| | | | Inches. | Inches. | | 1877. | |
| ORISSA. | | | | | | | |
| Orissa. | Cuttack | Cuttack... Telegraph Office | 0·50 | 5·30 | 22·40 | 14th July | |
| | | Cuttack... Hospital | 0·30 | 4·88 | 23·82 | ditto | |
| | | Jajpore | 0·20 | 4·40 | 36·20 | ditto | |
| | | Kendraparah | 0·80 | 8·10 | 30·20 | ditto | |
| | | Jagatsingpore | 0·30 | 4·40 | 16·95 | ditto | |
| | | False Point | 1·55 | 8·00 | 49·85 | ditto | |
| | Pooree | Pooree | 2·46 | 3·74 | 20·31 | ditto | |
| | | Khurdah | 1·65 | 4·15 | 24·07 | ditto | |
| | Balasore | Balasore... Exe. Engr.'s Office | 2·25 | 17·85 | 43·08 | ditto | |
| | | Balasore... Collector's Office | 2·11 | 18·39 | 43·73 | ditto | |
| | | Bhadrack | 0·50 | 7·51 | 39·06 | ditto | |
| | | Jellasore | 2·61 | 11·65 | 37·38 | ditto | |
| | | Sorah | 1·37 | 11·36 | 37·78 | ditto | |
| | | Chandbally | 1·40 | 7·67 | 30·67 | ditto | |
| | Cuttack Tributary Mehals | Sumbalpore | 4·81 | 6·81 | 38·68 | ditto | |
| | CHOTA NAGPORE. | | | | | | |
| | South-Western Frontier Agency. | | | | | | |
| | Hazareebagh | Hazareebagh... Jail | 1·66 | 2·39 | 20·08 | ditto | |
| | | Hazareebagh... Dispensary | 1·15 | 2·48 | 21·81 | ditto | |
| | | Pachamba | 3·23 | 5·65 | 20·79 | ditto | |
| | Lohardugga | Ranchee | 1·99 | 2·03 | 25·11 | ditto | |
| | | Palamow | 1·68 | 3·06 | 19·91 | ditto | |
| | Singbhoom | Chyebasea | 2·84 | 6·94 | 38·01 | ditto | |
| | Manbhoom | Puruliah | 0·52 | 4·79 | 28·99 | ditto | |
| | | Govindpore | 0·21 | 2·99 | 16·69 | ditto | |
| | ASSAM & ADJACENT HILLS. | | | | | | |
| | Sylhet | Sylhet | 2·30 | Not recd. | 61·11 | 7th July | |
| | Sibsagar | Sibsagar | 4·54 | ditto | 44·48 | ditto | |
| | | Golaghat | Not recd. | ditto | 36·25 | 30th June | |
| | | Jorhat | 2·82 | ditto | 35·01 | 7th July | |
| | | Deopanie | 3·65 | ditto | 40·86 | ditto | |
| | | Hattie Pootie | 4·74 | ditto | 40·82 | ditto | |
| | | Mazengah | 2·92 | ditto | 33·11 | ditto | |
| | | Nazira | 1·72 | ditto | 33·95 | ditto | |
| | | Suntock | 2·24 | ditto | 39·95 | ditto | |
| | | Cherideo | 2·86 | ditto | 39·43 | ditto | |
| | | Akyab | 6·60 | 13·20 | 64·31 | 14th July | |
| | Rajpootana | Alwar | Not recorded. | | Nil | 26th May | |
| | | Jaipur | 0·15 | 0·09 | 7·66 | 14th July | |
| | | Sambhar | Nil | Nil | 4·69 | ditto | |

CALCUTTA,
*The 21st July* 1877.

JOHN ELIOT, M.A.,
*Meteorological Reporter to the Govt. of Bengal.*

## Meteorological Telegraphic Report for the period 15th to 21st July 1877.

| Stations. | Date. | Hour. | Barometer reduced to 32°. | Barometer reduced to sea-level. | Hygrometer. Dry. | Hygrometer. Wet. | Humidity Sat.=100. | Wind. Direction. | Wind. Velocity. | Rain. | Clouds. | Weather initials. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Calcutta. | July 15th | 10 | 29·761 | 29·779 | 86·3 | 80·7 | 76 | S W by S | 10·0 | ..... | K | |
| | | 16 | 29·666 | 29·684 | 88·8 | 82·2 | 75 | S | 12·0 | ..... | K | |
| | 16th | 10 | 29·704 | 29·722 | 87·8 | 82·7 | 80 | S W by S | 11·8 | ..... | C | *scuds* |
| | | 16 | 29·606 | 29·625 | 83·8 | 78·7 | 79 | S | 9·3 | ..... | ..... | *o, d* |
| | 17th | 10 | 29·641 | 29·659 | 88·3 | 82·2 | 76 | S S W | 8·5 | ..... | C | |
| | | 16 | 29·547 | 29·565 | 86·3 | 79·7 | 74 | S | 10·8 | ..... | K, N | |
| | 18th | 10 | 29·579 | 29·597 | 88·6 | 83·0 | 78 | S S W | 8·5 | ..... | ..... | *o* |
| | | 16 | 29·507 | 29·526 | 84·3 | 81·2 | 87 | S by W | 12·0 | 0·25 | ..... | *o* |
| | 19th | 10 | 29·588 | 29·606 | 86·0 | 81·0 | 83 | S W by S | 7·3 | ..... | ..... | *o* |
| | | 16 | 29·504 | 29·522 | 88·3 | 81·3 | 73 | S W | 9·2 | ..... | K, K | |
| | 20th | 10 | 29·599 | 29·618 | 82·3 | 80·2 | 91 | S W | 5·5 | 0·46 | ..... | *o* |
| | | 16 | 29·5•0 | 29·599 | 82·8 | 79·7 | 87 | S W | 8·5 | 0·39 | ..... | *o* |
| | 21st | 10 | 29·714 | 29·736 | 77·6 | 76·5 | 95 | W | 5·0 | 3·32 | ..... | *o, r* |
| | | 16 | 29·516 | 29·535 | 82·6 | 79·5 | 87 | S | 4·8 | 0·25 | ..... | *o* |
| Saugor Island. | July 15th | 10 | 29·786 | 29·792 | 86 | 82 | 84 | S S W | 14·3 | ..... | FK | *b, m* |
| | | 16 | 29·689 | 29·695 | 87 | 83 | 84 | S S W | 15·5 | ..... | FK | *b, m* |
| | 16th | 10 | 29·726 | 29·732 | 87 | 83 | 84 | S W | 16·1 | ..... | FK | *b, m* |
| | | 16 | 29·614 | 29·620 | 86 | 84 | 84 | S S W | 17·2 | ..... | FK, P | *b, m, u* |
| | 17th | 10 | 29·660 | 29·666 | 87 | 85 | 92 | S W | 13·4 | 0·60 | FK | *b, m* |
| | | 16 | 29·579 | 29·585 | 85 | 82 | 87 | S S W | 18·0 | ..... | P, FK | *o, m u* |
| | 18th | 10 | 29·606 | 29·612 | 87 | 84 | 88 | W S W | 14·6 | 1·10 | P | *m, o, u* |
| | | 16 | 29·519 | 29·525 | 86 | 83 | 88 | S S W | 17·6 | ..... | P | *o, m, u* |
| | 19th | 10 | 29·612 | 29·618 | 86 | 81 | 80 | W S W | 20·7 | ..... | FK | *o* |
| | | 16 | 29·530 | 29·536 | 87 | 82 | 80 | S W | 23·8 | ..... | P | *o, u* |
| | 20th | 10 | 29·653 | 29·659 | 82 | 80 | 91 | S W | 12·8 | 0·30 | P | *o, r* |
| | | 16 | 29·604 | 29·610 | 83 | 79 | 83 | S S W | 16·9 | 0·30 | P | *m, o* |
| | 21st | 10 | 29·715 | 29·731 | 83 | 80 | 87 | S S W | 15·2 | 0·20 | P | *o, d* |
| | | 16 | 29·624 | 29·630 | 85 | 83 | 91 | S S E | 6·3 | 0·30 | P | *o, m* |
| Chittagong. | July 15th | 10 | 29·740 | 29·839 | 87 | 81 | 76 | S S W | 9·2 | ..... | K, C | *b, e* |
| | 16th | 10 | 29·670 | 29·761 | 88 | 83 | 80 | W S W | 7·8 | ..... | PK | |
| | 17th | 10 | 29·613 | 29·705 | 84 | 80 | 83 | S S W | 8·6 | 1·50 | PK | *g* |
| | 18th | 10 | 29·578 | 29·671 | 81 | 80 | 96 | S S E | 6·9 | 0·80 | ..... | *o, r* |
| | 19th | 10 | 29·588 | 29·680 | 83 | ■ | 91 | S S W | 7·3 | 1·00 | PK | |
| | 20th | 10 | 29·591 | 29·684 | 79 | 79 | 100 | S E | 6·7 | 3·20 | N | *r* |
| | 21st | 10 | 29·673 | 29·766 | 78 | 77 | 96 | S E | 7·5 | 3·20 | N | |
| Madras. | July 14th | 10 | 29·708 | 29·790 | 94 | 74 | 36 | W by N | 16 | ..... | ..... | *c* |
| | | 16 | 29·667 | 29·689 | 99 | 75 | 50 | S E by S | 13 | ..... | ..... | *c* |
| | 15th | 10 | 29·828 | 29·850 | 95 | 75 | 36 | W by N | 11 | ..... | ..... | *b* |
| | | 16 | 29·729 | 29·751 | 90 | 75 | 47 | S S E | 15 | ..... | ..... | |
| | 16th | 10 | 29·844 | 29·866 | 93 | 76 | 43 | W by N | 9 | 0·06 | ..... | *c* |
| | | 16 | 29·751 | 29·773 | 87 | 75 | 55 | S E by S | 13 | ..... | ..... | *c* |
| | 17th | 10 | 29·864 | 29·886 | 93 | 75 | 43 | W | 11 | ..... | ..... | *cloudy* |
| | | 16 | 29·751 | 29·773 | 87 | 77 | 62 | S S E | 13 | ..... | ..... | *cloudy* |
| | 18th | 10 | 29·831 | 29·853 | 94 | 74 | 36 | W by N | 13 | ..... | ..... | *bc* |
| | | 16 | 29·719 | 29·741 | 88 | 76 | 56 | S S E | 12 | ..... | ..... | *cloudy* |
| | 19th | 10 | 29·833 | 29·855 | 94 | 74 | 36 | W N W | 14 | ..... | ..... | *b* |
| | | 16 | 29·714 | 29·736 | 90 | 76 | 50 | S E by S | 12 | ..... | ..... | *c* |
| | 20th | 10 | 29·825 | 29·847 | 94 | 75 | 38 | W N W | 13 | ..... | ..... | *bc* |
| | | 16 | 29·729 | 29·751 | 89 | 77 | 56 | S E by S | 13 | ..... | ..... | *bc* |
| Cuttack. | July 15th | 10 | 29·696 | 29·778 | 87 | 80 | 72 | S S W | 6·8 | ..... | K PK, C | |
| | 16th | 10 | 29·666 | 29·748 | 87 | 80 | 72 | S W | 5·0 | ..... | CK, PC, C | |
| | 17th | 10 | 29·611 | 29·693 | 90 | 83 | 73 | S S W | 3·7 | ..... | C, CK | *c* |
| | 18th | 10 | 29·648 | 29·639 | 90 | 82 | 70 | S W | 5·4 | ..... | C, CK | *c* |
| | 19th | 10 | 29·581 | 29·662 | 86 | 78 | 68 | W S W | 4·1 | ..... | PK, C | |
| | 20th | 10 | 29·619 | 29·701 | 84 | 79 | 79 | S S W | 4·6 | 0·10 | PC, | *c, d* |
| | 21st | 10 | 29·648 | 29·729 | 90 | 80 | 63 | W S W | 4·0 | ..... | C | *c* |
| Akyab. | July 15th | 10 | 29·604 | 29·686 | 84 | 80 | 88 | S S E | 0·7 | ..... | CK, N | |
| | 16th | 10 | 29·760 | 29·782 | 79 | 76 | 87 | N W | 2·2 | 2·20 | N | |
| | 17th | 10 | 29·710 | 29·732 | 82 | 76 | 87 | S S W | 1·8 | ..... | CK, N | |
| | 18th | 10 | 29·693 | 29·715 | 81 | 78 | 87 | W S W | 3·0 | 2·80 | N | |
| | 19th | 10 | Not received. | | | | | | | | | |
| | 20th | 10 | 29·729 | 29·750 | 85 | 83 | 91 | S S W | 5·2 | 0·70 | CK, N | |
| | 21st | 10 | 29·769 | 29·791 | 81 | 79 | 91 | S S W | 3·0 | 2·60 | N | |

• Velocity of wind in miles per hour.

JOHN ELIOT, M.A.,
*Meteorological Reporter to the Government of Bengal.*

CALCUTTA,
*The 21st July* 1877.

# Abstract of Observations as received in the Meteorological Office, Calcutta, during the month of April 1877.

*N.B.—The Barometric data are reduced for temperatures and not for height above sea-level.*

| STATIONS. | Height above sea-level. | BAROMETER. Mean. | Mean of 10 hours. | Mean of 16 hours. | Range. | RADIATION THERMOMETER. Solar. Mean. | Above max. in shade. | Solar. Max. Day. | Solar. Max. ○ | Gross Nocturnal. Mean. | Below min. in shade. | Gross Nocturnal. Min. Day. | Gross Nocturnal. Min. ○ | TEMPERATURE OF AIR. Mean of max. | Mean daily range. | Mean of min. | Mean. | Mean of 10 hours. | Mean of 16 hours. | Highest Max. Day. | Highest Max. ○ | Absolute range. | Lowest Min. Day. | Lowest Min. ○ | VAPOUR TENSION. Mean. | From minima. | Mean of 10 hours. | Mean of 16 hours. | HUMIDITY. Mean. | From minima. | Mean of 10 hours. | Mean of 16 hours. | RAIN-FALL. In inches. | Number of days. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Seebsaugor ... | 331 | 29·580 | 29·645 | 29·507 | ·138 | 143·2 | 60·3 | 23 & 25th | 150·1 | 61·9 | 3·7 | 3rd | 52·6 | 91·9 | 17·3 | 64·6 | 72·3 | 73·4 | 79·5 | 19th | 99·5 | 33·4 | 6th | 58·1 | ... | ·577 | ·627 | ·619 | ... | 94 | 77 | 61 | 7·05 | 21 |
| Goalpara ... | 386 | 481 | ·541 | ·397 | ·146 | 144·9 | 59·9 | 25th | 153·2 | 63·3 | [illegible] | 1st | 53·5 | 85·0 | 18·5 | 66·5 | 75·2 | 76·6 | 82·6 | 21st | 93·2 | 35·1 | 3rd | 58·1 | ... | ·592 | ·672 | ·619 | ... | 91 | [illegible] | 56 | 8·47 | 17 |
| Darjeeling ... | 6,912 | 23·404 | 23·445 | 23·366 | ·379 | 122·1 | 60·3 | 14th | 146·1 | 38·9 | 8·6 | 1st & 2nd | 29·0 | 61·8 | 14·3 | 47·5 | 53·1 | 54·6 | 57·2 | 25th | 70·5 | 32·5 | 2nd | 38·0 | ... | ·280 | ·353 | ·257 | ... | 84 | 82 | 73 | 7·16 | 16 |
| Purneah ... | 125 | 29·713 | 29·783 | 29·645 | ·138 | 150·1 | 56·7 | 27 & 29th | 157·7 | 59·6 | 7·0 | 2nd | 45·5 | 93·4 | 26·8 | 66·6 | 70·7 | 82·7 | 89·9 | 20th | 103·6 | 47·0 | 6th | 55·6 | ... | ·566 | ·596 | ·526 | ... | 86 | 55 | 40 | 2·58 | 6 |
| Durbhunga ... | 166·32 | ·557 | ·608 | ·506 | ·102 | 150·3 | 60·3 | 18th | 164·9 | 59·7 | 9·9 | 2nd | 49·4 | 90·0 | 20·5 | 69·6 | 79·8 | 85·4 | 90·0 | 27th | 100·0 | 39·6 | 5th | 60·4 | ... | ·529 | ·564 | ·488 | ... | 76 | 61 | 38 | 0·93 | 5 |
| Patna ... | 179 | ·640 | ·710 | ·571 | ·139 | 159·6 | 62·2 | 29th | 170·0 | 62·4 | 9·1 | 2nd | 47·8 | 97·4 | 25·9 | 71·5 | 84·4 | 88·1 | 93·7 | 23rd | 106·6 | 48·5 | 2nd | 58·1 | ... | ·502 | ·468 | ·401 | ... | 66 | 38 | 27 | 0·13 | 1 |
| Gya ... | 347 | ·454 | ·524 | ·396 | ·128 | 150·1 | 52·8 | 29th | 165·4 | 64·9 | 8·0 | 2nd | 53·3 | 97·3 | 26·4 | 70·9 | 86·0 | 89·5 | 94·6 | 18& 27th | 104·2 | 44·2 | 1 & 2nd | 60·0 | ... | ·525 | ·612 | ·625 | ... | 71 | 44 | 39 | 0·45 | 3 |
| Hazareebagh... | 2,010 | 27·840 | 27·893 | 27·797 | ·106 | 151·7 | 61·8 | 30th | 163·6 | 61·1 | 6·5 | 2nd | 48·7 | 90·4 | 22·8 | 67·6 | 79·0 | 84·1 | 89·7 | 26th | 98·7 | 40·7 | 2nd | 56·0 | ... | ·406 | ·379 | ·317 | ... | 62 | 34 | 24 | 1·12 | 4 |
| Berhampore ... | 64 | 29·776 | 29·842 | 29·710 | ·132 | ... | ... | ... | ... | 65·8 | 5·6 | 3rd | 55·1 | 95·9 | 24·1 | 70·9 | 80·5 | 88·0 | 91·2 | 25th | 106·2 | 43·0 | 2 & 4th | 62·2 | ... | ·603 | ·610 | ·540 | ... | 79 | 52 | 41 | 3·09 | 6 |
| Burdwan ... | 99·09 | ·736 | ·8·0 | ·673 | ·127 | 163·3 | 57·8 | 24 & 25th | 164·8 | 64·2 | 8·6 | 4th | 56·0 | 95·5 | 22·7 | 72·8 | 84·3 | 87·7 | 94·1 | 24th | 105·9 | 41·5 | 4th | 64·4 | ... | ·657 | ·721 | ·642 | ... | 82 | 57 | 43 | 2·01 | 5 |
| Asansore ... | 90 | ·818 | ·883 | ·755 | ·128 | 151·4 | 57·9 | 16th | 164·3 | 67·5 | 5·9 | 4th | 58·0 | 95·5 | 21·0 | 72·5 | 80·4 | [illegible]·0 | 89·4 | 25th | 101·1 | 39·6 | 7th | 63·5 | ... | ·702 | ·825 | ·748 | ... | 87 | 69 | 57 | 4·41 | 11 |
| Dacca ... | 35 | ·828 | ·886 | ·772 | ·114 | 161·0 | 71·4 | 21st | 168·8 | 64·2 | 7·1 | 4th | 54·6 | 89·6 | 19·3 | 71·3 | 79·9 | 83·6 | 84·9 | 24th | 98·4 | 33·1 | 4th | 53·3 | ... | ·697 | ·899 | ·778 | ... | 91 | 73 | 66 | 6·08 | 16 |
| Silchar ... | 67·40 | ·908 | ·979 | ·796 | ·148 | 142·8 | 62·2 | 27th | 159·6 | 64·5 | 8·3 | 3rd | 56·9 | 84·6 | 16·9 | 67·7 | 77·3 | 78·9 | 84·3 | 19th | 92·5 | 32·1 | 4th | 50·4 | ... | ·641 | ·717 | ·705 | ... | 92 | 72 | 60 | 6·71 | 18 |
| Chittagong ... | 90 | ·804 | ·864 | ·756 | ·108 | 143·2 | 55·4 | 29th | 159·5 | 59·5 | 10·0 | 4th | 52·5 | 87·8 | 17·5 | 70·3 | 79·9 | 83·1 | 85·7 | 30th | 93·6 | 30·3 | 5th | 53·3 | ... | ·638 | ·818 | ·826 | ... | 81 | 72 | 67 | 2·03 | 6 |
| Bamangree ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 89·8 | 23·2 | 66·6 | ... | 79·8 | 83·8 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 3·20 | 8 |
| Calcutta (Alipore.) | 21·39 | ·835 | ·901 | ·769 | ·132 | 153·9 | 61·7 | 27th | 160·0 | 66·8 | 4·6 | 2nd | 55·7 | 92·2 | 18·8 | 73·4 | 79·8 | 85·0 | 89·7 | 25th | 100·4 | 34·9 | 4th | 55·5 | ·775 | ·762 | ·789 | ·665 | 75 | 93 | 66 | 2·50 | 4 |
| Sagor Island | 6 | ·843 | ·901 | ·799 | ·102 | 147·7 | 60·3 | 16th | 159·9 | 73·4 | 4·4 | 4th | 63·8 | 87·4 | 9·8 | 77·8 | 82·8 | 85·2 | 85·2 | 28th | 94·2 | 26·0 | 4th | 69·2 | ·913 | ·860 | ·922 | ·930 | 81 | 89 | 76 | 76 | 2·82 | 7 |
| Saddle Attack ... | 80 | ·777 | ·841 | ·702 | ·139 | ... | ... | ... | ... | ... | ... | ... | ... | 98·4 | 23·6 | 74·8 | 86·2 | 88·5 | 93·8 | 27th | 106·5 | 41·0 | 4th | 67·5 | ... | ·791 | ·707 | ·620 | ... | 92 | 54 | 41 | 3·69 | 13 |
| Saugor Island Point ... | 18·7 | ·880 | ·914 | ·802 | ·112 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 81·6 | 86·6 | 86·7 | ... | ... | ... | ... | ... | ·878 | ... | ·688 | ·689 | 92 | ... | 77 | 78 | 24·00 | 7 |
| Kedgeree ... | 31 | ·880 | ·930 | ·806 | ·124 | 116·7 | 28·8 | 28th | 120·6 | ... | ... | ... | ... | 87·9 | 5·3 | 82·6 | 85·5 | 86·7 | 86·9 | 27th | 91·5 | 11·8 | 3rd | 79·7 | ·844 | ·685 | ·831 | ·832 | 89 | 87 | 87 | 85 | ... | ... |
| Saugor ... | 22 | ·889 | ·944 | ·824 | ·126 | 138·5 | 46·9 | 5th | 147·4 | 76·5 | 2·0 | 15th | 71·1 | 91·6 | 15·1 | 76·5 | 83·6 | 86·9 | 86·8 | 20th | 98·4 | 30·6 | 17th | 79·6 | ... | ... | ... | ... | 88 | ... | 86 | 83 | ... | ... |
| Diamond Harbour ... | 21 | 29·885 | 29·944 | 29·832 | ·112 | 155·5 | 63·5 | 30th | 161·3 | 60·6 | 11·6 | 5th | 52·1 | 92·0 | 20·0 | 72·0 | 81·3 | 87·5 | 88·7 | 3, 11, 27, & 30th | 94·5 | 30·2 | 5th | 54·3 | ... | ·730 | ·773 | ·822 | ... | 92 | 59 | 65 | ... | ... |
| Port Blair ... | 61 | ·853 | ·903 | ·804 | ·099 | 147·3 | 55·1 | 9th | 153·8 | 68·7 | 9·1 | 21st | 68·2 | 92·5 | 14·7 | 77·8 | 83·9 | 88·0 | 90·1 | 29 & 30th | 94·6 | 20·2 | 18th | 74·4 | ... | ·845 | ·937 | ·906 | ... | 99 | 72 | 67 | 1 | ... |
| Akyab ... | 78 | ·821 | ·871 | ·771 | ·100 | 152·3 | 62·4 | 15th | 160·9 | 75·6 | 5·9 | 23rd | 69·9 | 89·9 | 8·9 | 81·6 | 84·8 | 86·7 | 86·0 | 9, 14. 16, 17, 28, & 30th | 91·1 | 11·8 | 19 & 23rd | 79·3 | ... | ·789 | ·878 | ·860 | ... | 73 | 66 | 65 | 2·80 | 4 |

CALCUTTA—APRIL 1877.

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Mean barometric pressure of 24 years | ... | 29·764 | Mean temperature of 24 years | ... | 84·7° | Mean humidity of 24 years | ... | 70 | Mean rainfall of 49 years | ... | 2·60 |
| Ditto ditto of 1877 | ... | 29·836 | Ditto ditto of 1877 | ... | 79·8° | Ditto ditto of 1877 | ... | 75 | Actual fall of 1877 | ... | 2·59 |
| Excess in 1877 | ... | ·081 | Defect in 1877 | ... | 4·9° | Excess in 1877 | ... | 5 | Defect in 1877 | ... | 0·01 |

CALCUTTA,
*The 20th July 1877.*

JOHN ELIOT, M.A.,
*Meteorological Reporter to the Govt. of Bengal.*

*Mean Pressures and Temperatures of the preceding Table reduced to sea-level, with Anemometric Results and Cloud Observations.*

| Stations. | Mean barometric pressure reduced to sea-level. | Mean temperature reduced to sea-level. | Wind. North. | North-east. | East. | South-east. | South. | South-west. | West. | North-west. | Calm. | Variable. | Percentage and Resultant. | Mean velocity daily. | Mean cloud. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Seebsaugor ... | 29·921 | 73·0 | 1 | 20 | 23 | 5 | 3 | 4 | 3 | 1 | ... | ... | 58 N 79° E | 84·6 | 8·25 |
| Goalpara ... | ·868 | 76·1 | 5 | 6 | 28 | 4 | ... | 1 | 7 | 2 | 7 | ... | 45 N 75° E | 145·9 | 3·06 |
| Darjeeling ... | ..... | ... | ... | ... | ... | 1 | 4 | 19 | 31 | 5 | ... | ... | 92 S 73° W | ..... | 7·28 |
| Purneah ... | ·841 | 80·0 | 1 | 4 | 24 | 4 | ... | 9 | 18 | 7 | ... | ... | 12 N 49° E | 110·8 | 2·60 |
| Durbhunga ... | ·728 | 80·1 | 1 | 6 | 19 | 4 | ... | 5 | 18 | 7 | ... | ... | 6 N 6° W | 122·1 | 3·77 |
| Patna ... | ·820 | 84·8 | 1 | 3 | 19 | 2 | ... | 2 | 38 | 2 | ... | ... | 42 N 86° W | 81·3 | 4·68 |
| Gya ... | ·803 | 86·3 | 6 | 5 | 8 | 1 | 2 | 3 | 23 | 11 | 1 | ... | 40 N 59° W | 92·4 | 0·98 |
| Hazareebagh ... | ·849 | 83·5 | 1 | 1 | ... | 2 | 2 | 6 | 24 | 24 | ... | ... | 74 N 76° W | 186·0 | 5·62 |
| Berhampore ... | ·843 | 80·6 | 7 | 2 | 7 | 5 | 6 | 14 | 9 | 10 | ... | ... | 24 S 74° W | ..... | 4·80 |
| Burdwan ... | ·838 | 83·1 | 3 | 1 | 5 | 6 | 11 | 8 | 17 | 9 | ... | ... | 37 S 60° W | 81·6 | 4·19 |
| Jessore ... | ·839 | 80·4 | ... | ... | 3 | 14 | 16 | 14 | 9 | 4 | ... | ... | 57 S 15° W | 91·3 | 4·23 |
| Dacca ... | ·864 | 80·2 | 1 | 1 | 4 | 9 | 28 | 8 | ... | ... | 5 | ... | 69 S 8° E | 119·7 | 4·98 |
| Silchar ... | ·899 | 77·5 | 1 | 5 | 20 | ... | 3 | 4 | 2 | 1 | 24 | ... | 30 S 66° E | 77·2 | 6·95 |
| Chittagong ... | ·896 | 80·3 | 5 | 6 | 6 | 5 | 14 | 11 | 5 | 6 | ... | ... | 21 S 20° W | 149·4 | 4·34 |
| Demagree ... | ..... | ... | 13 | 2 | 1 | 8 | 2 | 6 | 8 | 8 | 12 | ... | 21 N 50° W | ..... | 4·45 |
| Calcutta (Alipore.) | ·867 | 79·8 | 3 | ■ | 11 | 15 | 40 | 32 | 7 | 3 | ... | ... | 59 S 4° W | 140·2 | 3·19 |
| Saugor Island | ·849 | 82·8 | 1 | 4 | 4 | 7 | 44 | 51 | 6 | 2 | ... | ... | 72 S 22° W | 295·4 | 4·95 |
| Cuttack ... | ·859 | 86·4 | 1 | 1 | 1 | 3 | 15 | 15 | 16 | 7 | 1 | ... | 58 S 53° W | 100·1 | 4·83 |
| False Point ... | ·880 | 81·6 | ... | ... | 1 | 5 | 4 | 73 | 27 | 6 | 3 | 1 | 80 S 55° W | ..... | 3·83 |
| Vizagapatam ... | ·891 | 85·6 | ... | ... | ... | 10 | 44 | 30 | ■ | 13 | ... | ... | 68 S 32° W | 52·1 | 3·00 |
| Madras ... | ..... | ... | ... | ... | ■ | 48 | 2 | ... | ... | ... | ... | ... | 95 S 51° E | 208·0 | 3·70 |
| Akyab ... | ·907 | 81·3 | 3 | 3 | 6 | 5 | 5 | 8 | 23 | 7 | ... | ... | 37 S 79° W | 107·1 | 3·80 |
| Port Blair ... | ·916 | 84·0 | 1 | 23 | 25 | 4 | ... | 1 | 6 | ... | ... | ... | 66 N 70° E | ..... | 5·28 |
| Nancowry ... | ·900 | 85·0 | ... | 8 | 24 | 25 | ... | 3 | ... | ... | ... | ... | 79 S 73° E | 163·4 | 3·88 |

## NOTE.

*Barometric Pressure.*—The pressures in column 2 of the above table for all stations below 500 feet are reduced from those given in column 3 of the table on the previous page, by adding the weight of a column of air of the temperatures given in column 17. For stations above 500 feet elevation the reduction is made by Captain Allan Cunningham's table,—"Prof. papers on Indian Engineering, No. CXIII." The temperatures at the sea-level are taken from column 3 of the above table.

*Temperature.*—The temperatures in column 3 are reduced from those in column 17 on the preceding page, by adding 1° Fahrenheit for every 450 feet.

*Wind Resultant.*—The resultant wind direction and its comparative predominance are calculated from the whole number of wind observations recorded during the month. The relative predominance in the direction of the result is given as a percentage of the whole number of observations. The direction is computed in the usual way by Lambert's formula.

*Clouds.*—This column gives the average proportion of clouded sky, a cloudless sky being indicated by 0, and one completely overcast by 10.

The above being all comparable, afford the data for constructing a meteorological chart for the month which shall show the isobaric and isothermal lines and the resultant wind directions, which last may be represented by arrows of varying length, proportioned to the prevalence of the wind. To these may be added the rainfall from the previous tables.

JOHN ELIOT, M.A.,

*Meteorological Reporter to the Govt. of Bengal.*

CALCUTTA,
*The 20th July* 1877.

## Results of the Meteorological Observations taken at the Alipore Observatory from 15th to 21st July 1877.

| Month. | Date. | Maximum in sun. | Mean pressure; barometer at 32° Fah. | Temperature. Mean. | Maximum. | Range. | Minimum. | Hygrometry. Mean wet bulb. | Vapour tension. | Dew point. | Humidity. | Wind. Prevailing direction. | Miles recorded. | Rain. | Weather. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1877. | | ⊖ | Inches. | ⊖ | ⊖ | ⊖ | ⊖ | ⊖ | Inch. | ⊖ | % | | | Inch. | |
| July | 15th | 150·2 | 29·733 | 83·2 | 90·1 | 11·6 | 78·5 | 80·5 | 1·006 | 79·4 | 88 | Chiefly South .. | 191 | Nil | Partially cloudy. |
| " | 16th | 153·5 | ·668 | 81·8 | 91·9 | 11·4 | 80·5 | 79·5 | 0·979 | 78·6 | 90 | Chiefly S. S. W. | 204 | 0·41 | Chiefly cloudy, *d* at 9-10 P.M., *f* rain and *t* at 3 P.M., *o* & *g*. |
| " | 17th | 152·7 | ·607 | 83·2 | 93·7 | 14·1 | 78·0 | 80·1 | ·988 | 78·9 | 87 | Chiefly South ... | 191 | Nil | Cloudy, *d* at 1-10 P.M., *t* at 3-25 P.M., & *o*. |
| " | 18th | 146·0 | ·555 | 83·1 | 92·7 | 13·9 | 78·8 | 81·5 | 1·056 | 80·9 | 93 | South ... | 185 | 0·28 | Cloudy, rain and *t* at 2-45 P.M., *o* & *g*. |
| " | 19th | 143·8 | ·561 | 82·3 | 92·7 | 12·7 | 80·0 | 79·6 | 0·976 | 78·5 | 88 | Chiefly S. S. W. | 163 | Nil | Cloudy, rain at 6¼ P.M., *l* at 7-20 P.M., *t* at 7-49 P.M., *d*, *o*, & *g*. |
| " | 20th | 125·6 | ·604 | 81·3 | 84·0 | 7·0 | 77·0 | 79·8 | ·998 | 79·2 | 93 | Till 2 P.M. W. through S. W. till midnight, S. S. W., back again through S.W. | 163 | 0·84 | Cloudy, *d* and rain at intervals throughout the whole day, *o* & *g*. |
| " | 21st | 114·0 | ·659 | 78·7 | 83·5 | 8·1 | 75·4 | 77·8 | ·941 | 77·4 | 95 | Till 5¼ A.M. veer'd to N.E. by N. through W. and N. till midnight, South through N. and W. | 131 | 3·92 | Cloudy, *d* and rain at intervals till 12¾ P.M., *o* & *g*. |

| | | Inch. |
|---|---|---|
| The mean pressure of the seven days | ... ... ... | 29·625 |
| The average pressure of the corresponding period for 20 years | ... ... | 29·508 |
| | | ⊖ |
| The mean temperature of the seven days | ... ... ... | 81·9 |
| The average temperature of the corresponding period for 20 years | ... | 83·4 |
| The extreme variation of temperature during the seven days | .. ... | 17·8 |
| The maximum temperature during the seven days | ... ... | 92·7 |
| | | Per cent. |
| The mean humidity during the seven days | ... ... ... | 91 |
| The average humidity of the corresponding period for 24 years | ... ... | 83 |
| | | Inch. |
| The total fall of rain from 15th to 21st July | ... ... | 5·40 |
| The average fall of the corresponding period for 24 years | ... ... | 2·53 |
| The total fall from 1st January to 21st July | ... ... | 30·52 |
| The average fall of the corresponding period for 24 years | ... ... | 29·74 |

The mean pressure, temperature, &c., are deduced from observations made at 8h., 10h., 16h., and 22h.; the maximum and minimum temperatures from self-registering thermometers. All the thermometers are verified, and the readings have been corrected to a standard constructed and verified at the Kew Observatory. They are exposed under a thatched shed open at the sides, and are suspended four feet above the ground.

The barometer readings are corrected approximately to those of the standard (Newman's No. 86) at the Surveyor-General's Office.

The hygrometric elements are obtained from tables III, IV, and V of the official tables computed in the Meteorological Office, and based on Regnault's modification of August's formula.

The direction and movement of the wind are taken from the trace of Beckley's anemograph.

The mouth of the rain-gauge is one foot above the ground.

*d* drizzling, *t* thunder, *l* lightning, *o* overcast, *g* gloomy, *f* strong wind.

JOHN ELIOT, *Meteorological Reporter to the Government of Bengal, for Meteorological Reporter to the Government of India.*

METEOROLOGICAL OFFICE, INDIA, the 22nd July 1877.

# Reports of Fluctuations of Traffic on the East Indian Railway for the Month of June 1877.

EAST INDIAN RAILWAY, TRAFFIC MANAGER'S OFFICE, JUMALPORE, THE 14TH JUNE 1877.

*Remarks on Traffic of East Indian Railway for five weeks ending 30th June 1877.*

The approximate figures for the period are as follows :—

| | Coaching. | | Goods | | Total. |
|---|---|---|---|---|---|
| | Mds. | Rs. | Mds. | Rs. | Rs. |
| 1877 ... ... ... ... ... ... ... ... | 6,81,760 | 7,34,923 | 66,33,631 | 30,47,453 | 37,82,376 |
| 1876 ... ... ... ... ... ... ... ... | 6,07,296 | 6,48,761 | 48,03,276 | 21,01,617 | 27,50,378 |
| Increase .. ... ... ... ... ... ... ... | 74,464 | 86,962 | 17,30,555 | 9,45,836 | 10,31,998 |
| Decrease ... ... ... ... ... ... ... | ..... | ..... | ..... | ..... | ..... |

In merchandise traffic the principal changes are in—

| *Increases.* | *Decreases.* |
|---|---|
| Coal. | Piece-goods. | Cotton. |
| Grain. | Sugar. | For railway material. |
| Gunny. | Tea. | Seeds. |
| Iron. | Tobacco. | |
| Other materials. | | |

| *Increases.* | Mds. | | Rs. | |
|---|---|---|---|---|
| Coal—Up ... ... ... | 1,28,765 | | 47,816 | |
| Down ... ... ... | 2,67,880 | | 40,925 | |

This brings the increase in the public coal traffic during the half-year up to about—

| | Tons. | | | |
|---|---|---|---|---|
| Upward coal ... ... ... | 21,000 | | 1,60,000 | |
| Downward coal ... ... ... | 26,000 | | 1,10,000 | |
| | | 47,000 | | 2,70,000 |

the weight of coal lifted in the half-year having averaged about 1,750 tons a day.

| | Mds. | | Rs. | |
|---|---|---|---|---|
| Grain ... ... ... | 12,22,212 | | 6,72,882 | |
| Made up as under— | | | | |
| Wheat ... ... ... | 9,06,630 | | 5,87,631 | |
| Rice ... ... ... | 31,293 | | 14,375 | |
| Other cereals ... ... ... | 1,48,558 | | 38,236 | |
| Pulses ... ... ... | 1,35,731 | | 32,643 | |
| | | 12,22,212 | | 6,72,882 |

The increase in these staples during the half-year may now be approximately stated as under—

| | Tons. | Rs. |
|---|---|---|
| Wheat ... ... ... | 1,03,000 | 18,60,000 |
| Rice ... ... ... | 48,000 | 1,85,000 |
| Other cereals ... ... ... | 52,000 | 2,90,000 |
| Pulses ... ... ... | 18,000 | 1,80,000 |

making up an increase in weight lifted in this one staple of food-grains of about two hundred and twenty thousand tons, with an increase in earnings on our main line alone of about a quarter of a million sterling, of which wheat contributes three-fourths.

| | Mds. | Rs. |
|---|---|---|
| Gunny ... ... ... ... | 24,544 | 25,406 |

This is in new gunny sent up from Howrah for packing produce for shipment.

| | | | |
|---|---|---|---|
| Iron ... ... ... | 36,510 | 40,436 | |

There has been a largely increased demand for iron for manufacturing purposes in the up-country marts this year. Including the above-noted figures, the increase for the half-year will not be less than 4,500 tons, or some 40 per cent. over 1876.

| | Mds. | | Rs. | |
|---|---|---|---|---|
| Other materials—Brass ... ... | 3,820 | | 2,720 | |
| Copper ... ... | 4,530 | | 5,935 | |
| Spelter ... ... | 3,463 | | 6,240 | |
| | | 11,813 | | 14,895 |

These, though not separately increases of any great amount, betoken a healthy state of trade.

| | | | |
|---|---|---|---|
| Piece-goods ... ... ... | Mds. 89,048 | Rs. | 98,530 |

There has been a very considerable demand in the up-country markets during the month; and this large increase brings up the total for the half-year above that for the corresponding period of 1876.

| | | | |
|---|---|---|---|
| Sugar ... ... ... | Mds. 46,827 | Rs. | 10,371 |

This is a considerable increase, and would have been much larger if we could have found wagons for it, and have dealt with it at Howrah.

The increase in the sugar traffic for the half-year has however been about 3,000 tons in spite of all difficulties.

| | | | |
|---|---|---|---|
| Tea ... ... ... | Mds. 3,667 | Rs. | 4,326 |

The Darjeeling tea has been coming into the market somewhat early this year.

| | | | |
|---|---|---|---|
| Tobacco ... ... ... | Mds. 31,967 | Rs. | 19,057 |

This traffic has also been crippled by the difficulty of finding conveyance for it, but the increase is considerable.

*Decreases.*

| | | | |
|---|---|---|---|
| Cotton ... ... ... | Mds. 30,524 | Rs. | 48,090 |

There is scarcely any export going on, and the loose cotton traffic has been kept back by the heavy stocks of grain we have had on hand.

The total figures of cotton traffic for the half-year however are slightly in excess of those for 1876.

| | | | |
|---|---|---|---|
| For railway material ... ... | Mds. 27,777 | Rs. | 2,021 |

There is very little going up just now, whereas in June 1876 there were heavy despatches for the Tirhoot State Railway. It will be seen that the decrease in *Earnings* has been very small.

| | | | |
|---|---|---|---|
| Seeds ... ... ... | Mds. 14,966 | Rs. | 32,301 |

A good deal of the seed traffic has been kept back by the anxiety of merchants to push wheat forward in consequence of the heavy forward speculations in that staple.

The weight of seeds carried during the half-year however will be found to show the very considerable increase of some 15,000 tons.

Salt and jaggree show an increase in Earnings, together with a decreased weight, as under :—

| | | | |
|---|---|---|---|
| Salt ... ... ... | Mds. 39,823 | Rs. | 958 |

There was an increase in the quantity sent up from Howrah owing to heavy imports bringing rates down, while the traffic from the R. S. Railway *viâ* Delhi and Agra has been seriously diminished from want of wagons.

| | | | |
|---|---|---|---|
| Jaggree ... ... ... | Mds. 28,374 | Rs. | 3,174 |

The decrease is mainly in the traffic from Cawnpore and from the O. and R. Railway, where the grain speculations have absorbed attention, while the increase has been in the Behar exports, for which wagons going up-country for grain have been utilised.

The train mileage for the period has been—

| | Coaching. | Goods. | Total. |
|---|---|---|---|
| 1877 ... ... ... ... | 2,08,616 ... | 5,80,289 ... | 7,88,905 |
| 1876 ... ... ... ... | 2,07,638 ... | 4,26,600 ... | 6,34,238 |
| Increase ... ... ... ... | 978 ... | 1,53,689 ... | 1,54,667 |
| Decrease ... ... ... ... | ..... ... | ... ... | ... ... |

EARNING PER TRAIN MILE.

| | Coaching. Rs. A. P. | Goods. Rs. A. P. | Total. Rs. A. P. |
|---|---|---|---|
| 1877 ... ... ... ... | 3 8 4 ... | 5 4 0 ... | 4 12 9 |
| 1876 ... ... ... ... | 3 2 0 ... | 4 14 10 ... | 4 5 5 |
| Increase ... ... ... ... | 0 6 4 ... | 0 5 2 ... | 0 7 4 |
| Decrease ... ... ... ... | ..... ... | ..... ... | ..... |

The increase in goods mileage earning is in direct proportion to the increase in weight, while the earnings per mile on the whole traffic are very satisfactory.

JUBBULPORE LINE TRAFFIC.

| | Coaching. | | Goods. | | Total. |
|---|---|---|---|---|---|
| | Mds. | Rs. | Mds. | Rs. | Rs. |
| 1877 ... ... ... ... ... | 29,657 | 68,904 | 10,82,446 | 2,49,781 | 3,18,745 |
| 1876 ... ... ... ... ... | 24,376 | 57,800 | 4,78,815 | 1,13,523 | 1,71,323 |
| Increase ... ... ... ... | 5,281 | 11,164 | 5,83,631 | 1,36,258 | 1,47,422 |
| Decrease ... ... ... ... | ..... | ..... | ..... | ..... | ..... |

The increase in passenger traffic is attributable to the same causes as above remarked on in dealing with main line figures.

In merchandise traffic, it will be seen, the increase is 120 per cent. or more.

This is mainly due to the very heavy traffic in grain and seeds to Bombay and the famine districts.

The following is a statement of grain and seeds sent to Howrah and sent *viâ* Jubbulpore during five weeks ending 30th June 1877.

| | Wheat. | Pulses. | Other cereals. | Seeds. | Total. |
|---|---|---|---|---|---|
| | Mds. | Mds. | Mds. | Mds. | Mds. |
| To Howrah ... ... ... | 12,18,606 | 8,233 | 2,69,340 | 6,13,947 | 21,10,126 |
| *Vid* Jubbulpore ... ... | 2,02,365 | 2,38,874 | 1,16,959 | 1,00,866 | 6,58,864 |
| Total ... | 14,20,971 | 2,47,107 | 3,86,299 | 7,14,813 | 27,68,990 |

MAIN LINE.

*Statement showing the Increases and Decreases of Staples during five weeks ending 30th June 1877.*

| STAPLES. | Increases. | | Decreases. | |
|---|---|---|---|---|
| | Mds. | Rs. | Mds. | Rs. |
| Beer, Commissariat ... ... ... ... ... ... ... ... | 8,440 | 20,904 | ..... | ..... |
| Betel-nuts ... ... ... ... ... ... ... ... ... ... | ..... | 2,849 | 1,964 | ..... |
| Brass and brassware ... ... ... ... ... ... ... ... | 3,820 | 2,720 | ..... | ..... |
| Bricks ... ... ... ... ... ... ... ... ... ... | ..... | ..... | 380 | 1,412 |
| Coal, up ... ... ... ... ... ... ... ... ... ... | 1,28,765 | 47,816 | ..... | ..... |
| ,, down ... ... ... ... ... ... ... ... ... ... | 2,67,880 | 40,925 | ..... | ..... |
| Copper ... ... ... ... ... ... ... ... ... ... | 4,530 | 5,935 | ..... | ..... |
| Cotton ... ... ... ... ... ... ... ... ... ... | ..... | ..... | 30,524 | 46,090 |
| Cotton, twist ... ... ... ... ... ... ... ... ... | 3,376 | 8,950 | ..... | ..... |
| Dyewood ... ... ... ... ... ... ... ... ... ... | ..... | ..... | 3,551 | 4,537 |
| Firewood ... ... ... ... ... ... ... ... ... ... | ..... | ..... | 19,280 | 465 |
| Fruits ... ... ... ... ... ... ... ... ... ... | ..... | ..... | 1,449 | 1,649 |
| Ghee and oil ... ... ... ... ... ... ... ... ... | 3,467 | 946 | ..... | ..... |
| G. B. T. packages ... ... ... ... ... ... ... ... | 163 | 845 | ..... | ..... |
| Government Commissariat stores ... ... ... ... ... | 710 | 1,676 | ..... | ..... |
| Government Ordnance stores ... ... ... ... ... ... | 5,036 | 2,207 | ..... | ..... |
| Rice ... ... ... ... ... ... ... ... ... ... | 31,283 | ..... | ..... | 14,375 |
| Wheat ... ... ... ... ... ... ... ... ... ... | 9,06,630 | 5,87,631 | ..... | ..... |
| Oats ... ... ... ... ... ... ... ... ... ... | 3,731 | 2,663 | ..... | ..... |
| Pulses of all kinds ... ... ... ... ... ... ... ... | 1,35,731 | 52,643 | ..... | ..... |
| Other cereals ... ... ... ... ... ... ... ... ... | 1,44,827 | 56,170 | ..... | ..... |
| Gunny ... ... ... ... ... ... ... ... ... ... | 24,544 | 25,406 | ..... | ..... |
| Iron ... ... ... ... ... ... ... ... ... ... | 36,510 | 40,436 | ..... | ..... |
| Jaggree ... ... ... ... ... ... ... ... ... ... | ..... | 5,147 | 28,374 | ..... |
| Lac ... ... ... ... ... ... ... ... ... ... | ..... | ..... | 11,065 | 15,900 |
| Minerals ... ... ... ... ... ... ... ... ... ... | 13,902 | 1,787 | ..... | ..... |
| Mowah flower ... ... ... ... ... ... ... ... ... | ..... | ..... | 2,205 | 383 |
| Opium ... ... ... ... ... ... ... ... ... ... | 10,397 | 5,065 | ..... | ..... |
| Piece-goods ... ... ... ... ... ... ... ... ... | 69,948 | 33,530 | ..... | ..... |
| Railway materials, construction account ... ... ... ... | ..... | ..... | 6,534 | 346 |
| ,, ,, foreign ... ... ... ... ... ... ... | ..... | ..... | 27,777 | 2,021 |
| Safflower ... ... ... ... ... ... ... ... ... ... | 1,013 | 344 | ..... | ..... |
| Salt ... ... ... ... ... ... ... ... ... ... | ..... | 988 | 30,832 | ..... |
| Saltpetre ... ... ... ... ... ... ... ... ... ... | ..... | ..... | 13,527 | 8,988 |
| Seeds ... ... ... ... ... ... ... ... ... ... | ..... | ..... | 14,966 | 32,501 |
| Spelter ... ... ... ... ... ... ... ... ... ... | 3,468 | 6,240 | ..... | ..... |
| Spices ... ... ... ... ... ... ... ... ... ... | 704 | 528 | ..... | ..... |
| Stones ... ... ... ... ... ... ... ... ... ... | 72,560 | 2,936 | ..... | ..... |
| Sugar ... ... ... ... ... ... ... ... ... ... | 66,627 | 10,271 | ..... | ..... |
| Tea ... ... ... ... ... ... ... ... ... ... | 2,667 | 4,236 | ..... | ..... |
| Timber ... ... ... ... ... ... ... ... ... ... | ..... | ..... | 3,690 | 1,473 |
| Tobacco ... ... ... ... ... ... ... ... ... ... | 31,997 | 19,697 | ..... | ..... |
| Turmeric ... ... ... ... ... ... ... ... ... ... | 1,722 | 545 | ..... | ..... |
| Wines ... ... ... ... ... ... ... ... ... ... | ..... | ..... | 706 | 2,290 |
| Miscellaneous ... ... ... ... ... ... ... ... ... | 13,906 | 26,128 | ..... | ..... |
| Total ... | 19,49,089 | 10,36,598 | 2,05,954 | 1,34,893 |

N. ST. L. CARTER, *Offg. Traffic Manager.*

# Weekly Return of Traffic Receipts on Indian Railways.

## EAST INDIAN RAILWAY—JUBBULPORE LINE.

*Approximate Return of Traffic for week ended 14th July 1877, on 223½ miles open.*

| | Coaching Traffic. | | | Merchandise and Mineral Traffic. | | | Total Traffic Receipts. | Train Miles run. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. of passengers. | Coaching receipts. | | Weight carried. | Receipts. | | | Coaching. | Merchandise. | Total. |
| | | Rs. A. P. | £ s. d. | Mds. Sr. | Rs. A. P. | £ s. d. | Rs. A. P. | | | |
| Total traffic for the week ... | 5,280½ | 13,174 3 9 | 1,115 19 6 | 2,83,760 0 | 62,694 6 0 | 6,746 1 7 | 76,868 10 9 | 6,651 | 19,683½ | 30,539½ |
| Or per mile of railway ... ... | ..... | 54 6 7 | 4 19 9 | ..... | 280 2 5 | 23 13 7 | 334 9 0 | ..... | ..... | ..... |
| For previous 1 week of half-year ... ... ... ... | 5,583 | 13,776 6 6 | 1,361 15 1 | 2,23,260 0 | 55,061 10 0 | 5,047 6 4 | 68,837 2 6 | 4,756½ | 13,480½ | 18,237 |
| Total for 2 weeks ... | 10,863½ | 25,949 11 3 | 2,476 14 5 | 5,07,020 0 | 1,17,746 2 6 | 10,793½ 7 11 | 1,45,696 13 3 | 9,407½ | 29,163½ | 38,576½ |
| Comparison. | | | | | | | | | | |
| Total for corresponding week of previous year ... ... | 2,261½ | 10,405 5 6 | 989 6 9 | 48,[illegible] 0 | 11,448 2 9 | 1,049 17 6 | [illegible],907 12 3 | 4,516 | 2,649 | 7,165 |
| Per mile of railway, corresponding week of previous year ... ... ... ... | ..... | 46 12 4 | 4 5 9 | ..... | 51 3 3 | 4 13 9 | 97 14 7 | ..... | ..... | ..... |
| Total to corresponding date of previous year ... ... | 8,773 | 22,963 4 6 | 2,106 14 2 | 93,535 20 | 24,063 13 9 | 2,200 17 0 | 47,046 1 3 | 9,263 | 6,973 | 15,236 |

## EAST INDIAN RAILWAY—MAIN LINE.

*Approximate Return of Traffic for week ended 14th July 1877, on 1,279½ miles open.*

| | | Rs. A. P. | £ s. d. | Mds. Sr. | Rs. A. P. | £ s. d. | Rs. A. P. | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Total traffic for the week ... | 134,914½ | 1,44,529 5 3 | 13,248 10 5 | 13,13,464 20 | 5,99,375 14 9 | 54,943 15 11 | 7,43,905 4 8 | 44,605 | 117,833½ | 162,237½ |
| Or per mile of railway ... | ..... | 112 15 0 | 10 7 0 | ..... | 468 6 8 | 43 18 8 | 581 4 8 | ..... | ..... | ..... |
| For previous 1 week of half-year ... ... ... ... | 134,246½ | 1,45,468 5 6 | 13,336 8 6 | 13,06,532 20 | 6,26,536 12 0 | 57,492 14 4 | 7,72,037 1 6 | 44,473½ | 111,239 | 155,717½ |
| Total for 1 week ... ... | 269,161 | 2,90,017 10 9 | 26,584 19 1 | 26,20,007 10 | 12,25,914 10 9 | 1,12,376 10 3 | 15,15,943 6 6 | 88,083½ | 229,071½ | 317,954½ |
| Comparison. | | | | | | | | | | |
| Total for corresponding week of previous year ... ... | 102,033½ | 1,25,327 4 1 | 11,486 6 8 | 5,90,963 20 | 4,92,091 15 3 | 38,508 5 7 | 5,27,419 5 4 | 42,616 | 76,199 | 120,815 |
| Per mile of railway, corresponding week of previous year ... ... ... ... | ..... | 97 14 11 | 8 19 7 | ..... | 384 3 1 | 29 16 9 | 412 2 0 | ..... | ..... | ..... |
| Total to corresponding date of previous year ... ... | 242,034½ | 2,74,566 [illegible] 6 | 25,169 11 3 | 18,15,954 20 | 9,08,993 9 9 | 69,825 13 1 | 11,78,119 11 11 | 90,619 | 163,096 | 254,615 |

## EASTERN BENGAL RAILWAY.

*Approximate Return of Traffic for week ended 14th July 1877, on 158½ miles open.*

| | Coaching Traffic. | | | Merchandise and Mineral Traffic. | | | Total receipts. |
|---|---|---|---|---|---|---|---|
| | Number of passengers. | Coaching receipts. | | Weights carried. | Receipts. | | |
| | | Rs. A. P. | £ s. d. | Mds. Sr. | Rs. A. P. | £ s. d. | £ s. d. |
| Total traffic for the week ... ... ... | 38,765½ | 22,409 7 6 | 2,054 4 9 | 3,63,376 15 | 59,653 9 6 | 5,376 9 9 | 7,430 18 9 |
| Or per mile of railway ... ... ... | 245 | 141 9 9 | 12 18 7 | 1,917 3 | 376 10 1 | 33 19 6 | 46 19 1 |
| For previous 1 week of half-year... ... | 23,583 | 21,535 8 9 | 1,974 1 8 | 1,01,745 32 | 42,906 14 3 | 3,874 9 0 | 5,848 10 8 |
| Total for 2 weeks ... | 62,348½ | 43,944 14 3 | 4,028 6 5 | 4,65,120 15 | 1,02,919 6 1 | 9,250 18 9 | 13,279 4 5 |
| Comparison. | | | | | | | |
| Total for corresponding week of previous year ... ... ... ... ... | 32,805 | 22,783 3 1 | 2,086 9 2 | 1,80,748 15 | 35,315 6 10 | 3,336 1 7 | 5,218 10 9 |
| Per mile of railway, corresponding week of previous year ... ... ... | 206 | 143 18 6 | 13 3 11 | 1,142 5 | 223 3 6 | 20 6 0 | 33 11 11 |
| Total to corresponding date of previous year ... ... ... ... ... | 70,618 | 45,074 9 9 | 4,131 16 9 | 3,14,899 12 | 69,970 12 11 | 6,407 6 6 | 9,639 3 3 |

## CALCUTTA AND SOUTH-EASTERN STATE RAILWAY.

*Approximate Return of Traffic for week ended 14th July 1877, on 28 miles open.*

| | | Rs. A. P. | £ s. d. | Mds. Srs. | Rs. A. P. | £ s. d. | £ s. d. |
|---|---|---|---|---|---|---|---|
| Total traffic for the week ... ... ... | 8,935 | 1,280 0 0 | 125 0 0 | 13,716 0 | 448 0 0 | 44 16 0 | 177 16 0 |
| Or per mile of railway ... ... ... | 319 | 47 5 [illegible] | 4 15 0 | 490 [illegible] | 16 0 0 | 1 12 0 | 6 7 0 |
| For previous 1 week of half-year ... | 8,781 | 1,274 0 0 | 127 8 0 | 14,868 0 | 480 0 0 | 46 0 0 | 173 8 0 |
| Total for 2 weeks ... ... ... | 17,084 | 2,604 0 0 | 260 8 0 | 28,584 0 | 928 0 0 | 92 16 0 | 353 4 0 |
| Comparison. | | | | | | | |
| Total for corresponding week of previous year ... ... ... ... ... | 6,753 | 976 10 9 | 97 12 4 | 14,748 0 | 465 11 5 | 46 11 4 | 144 4 8 |
| Per mile of railway, corresponding week of previous year ... ... ... ... | 241 | 34 14 1 | 3 9 0 | 527 0 | 16 19 1 | 1 13 3 | 5 3 0 |
| Total to corresponding date of previous year | 13,536 | 1,957 15 3 | 220 15 10 | 27,210 20 | 839 1 6 | 85 15 1 | 262 13 11 |

## NALHATI STATE RAILWAY.

*Approximate Return of Traffic for week ended 14th July 1877, on 27¼ miles open.*

| | Coaching Traffic. | | | Merchandise and Mineral Traffic. | | | Total receipts. |
|---|---|---|---|---|---|---|---|
| | Number of passengers. | Coaching receipts. | | Weight carried. | Receipts | | |
| | | Rs. A. P. | £ s. d. | Mds. Srs | Rs. A. P. | £ s. d. | £ s. d. |
| Total traffic for the week ... ... ... ... | 2,158 | 977 0 0 | 97 14 0 | 11,238 0 | 706 0 0 | 79 12 0 | 177 6 0 |
| Or per mile of railway ... ... ... ... | 80 | 36 0 0 | 3 12 0 | 412 0 | 29 0 0 | 2 18 0 | 6 10 0 |
| For previous 1 week of half-year ... ... | 2,105 | 951 0 0 | 95 2 0 | 10,210 0 | 677 0 0 | 67 14 0 | 162 16 0 |
| Total for 2 weeks ... ... ... ... | 4,263 | 1,928 0 0 | 192 16 0 | 21,454 0 | 1,473 0 0 | 147 6 0 | 340 2 0 |
| Comparison. | | | | | | | |
| Total for corresponding week of previous year | 1,970 | 975 7 6 | 97 10 11 | 2,003 18 | 362 8 0 | 36 5 0 | 133 15 11 |
| Per mile of railway, corresponding week of previous year ... ... ... ... ... | 73 | 35 12 9 | 3 11 7 | 73 12 | 9 10 2 | 0 19 3 | 4 10 10 |
| Total to corresponding date of previous year | 4,191½ | 2,155 1 3 | 215 10 2 | 4,690 0 | 560 1 9 | 56 0 2 | 271 10 4 |

Printed and published by Edwin Morris Lewis, at the Printing Office of the Bengal Secretariat, No. 23, Chowringhee, in the City of Calcutta.—25th July 1877.

[REGISTERED NO. 29.]

No. 31 of 1877.

# SUPPLEMENT TO
# The Calcutta Gazette.

WEDNESDAY, AUGUST 1, 1877.

## OFFICIAL PAPERS.

*Non-Subscribers to the* GAZETTE *may receive the* SUPPLEMENT *separately on payment of Six Rupees per annum if delivered in Calcutta, or Twelve Rupees if sent by Post.*

## CONTENTS.



## ENQUIRY INTO THE THEORY OF EPIDEMIC FEVER BEING CAUSED SOLELY BY OBSTRUCTIONS TO NATURAL DRAINAGE.

FINANCIAL DEPARTMENT.—SANITATION.

*Calcutta, the 31st July 1877.*

READ again the following papers:—

Memorandum by Rajah Digumber Mitter, C.S.I., dated the 16th December 1876, adducing instances in support of his theory that the sole cause of the epidemic fever, which of late years has prevailed in the districts round Calcutta, lies in the obstructions caused to the natural drainage of the country by the construction of railways, roads, and embankments.

Minute recorded by Sir Richard Temple, dated the 5th January 1877, on the subject.

Sanitation Collection I, January 1877, Nos. 3 to 7.

Sanitation Collection I, February 1877, Nos. 10 to 14.

Sanitation Collection I, March 1877, Nos. 23 to 27, relative to the appointment of a special committee, consisting of the following gentlemen, to inquire into the obstructions to the drainage in the districts around Calcutta, and to make a careful inspection of the general features of the fever-stricken tract, after consulting all the reports that had been written on the subject of the fever, viz.—

The Sanitary Commissioner for Bengal ... *President.*

Mr. J. Whitfield, C.E., Executive Engineer,
Baboo Amrita Lal Mozoomdar, Assistant Surgeon,
Baboo Peari Mohun Mookerjee, } *Members.*

The District Magistrates, Executive Engineers, and Civil Surgeons of Howrah, Hooghly, Burdwan, Nuddea, Jessore, and 24-Pergunnahs,—*ex officio* members, as far as their own districts are concerned.

Deputy Collector Baboo Hem Chunder Kerr, Member and Secretary.

Letter from the Sanitary Commissioner for Bengal, No. 594MI, dated the 15th May 1877.

Letter to the Sanitary Commissioner for Bengal, No. 1628, dated the 29th May 1877.

Read—

The Report of the Committee of Inquiry, dated the 4th July 1877.

At the outset of the proceedings the Sanitary Commissioner reported that in the absence of precise definition of the limits of the investigation, the work before the Committee was one of very great magnitude, while at the same time it appeared that Rajah Digumber Mitter and his friends were opposed to any lengthened investigation, believing that the truth of their theory was already fully established, and that it only remained for Government to take action to secure the proper drainage of villages. Dr. Lethbridge, while unable to accept the view that dampness of subsoil could be the sole and only cause of the fever, or that this dampness, which is general in Lower Bengal, had been brought about by roads and railways, yet thought that while inquiring into the causes of the dampness in the tracts subject to the epidemic fever, which was an admitted factor in the production of the disease, the Committee might set itself to devise a general scheme for providing sufficient drainage for this tract, and he suggested that the engineering element on the committee should be strengthened for the purposes of an inquiry of this nature.

2. In reply to this proposal the Lieutenant-Governor observed that while Rajah Digumber Mitter's theory was possibly right in some respects, artificial obstructions having in many cases occasioned, and in others aggravated, the outbreak of fever, it had nevertheless been repeatedly demonstrated that the fever had prevailed in villages and in parts of the country on which roads and railways had had no possible influence. At the same time much had already been done in the way of devising drainage schemes in both Hooghly and Burdwan. Less than two years ago a commission had been appointed for this very purpose, but general drainage works had nevertheless not been undertaken, simply because all such schemes were practically impossible. Special schemes under special laws had been carried out, and might still be taken up if the funds were forthcoming, and good reason shown in each particular case. It was impossible for Government to undertake drainage works except at the invitation and with the co-operation of the landholders and others concerned. Admitting, however, that the question of drainage was of the highest importance, and that the present Committee might throw some further light on it by minute local inquiry, the Lieutenant-Governor requested them to examine, in the first instance, the specific localities of Shibpore, Bally, and Connaggur, referred to in the Rajah's memorandum, in order that it might be seen from their investigations there whether there were grounds for continuing the investigation.

3. The report of the Committee has now been received, and it leaves matters exactly in the position described in the above letter. As regards the particular instances of artificially obstructed drainage referred to by Rajah Digumber Mitter in support of his special views, the facts ascertained by the Committee do not bear out his theory. But neither, on the other hand, do they disprove the position that the saturation of the subsoil in the Deltaic districts of Bengal is one chief cause of fever, or that this saturation may have been aggravated of late years by both natural and artificial changes.

4. Even were the measures which Government ought to adopt clear and indisputable, the present financial condition of the province prevents it from undertaking anything like a general system of district drainage at the cost of the public revenues. But if in any particular case it is found that improvement can be effected by means of manageable local schemes, and that those benefited are willing and able to pay for the necessary works, Government will be very ready to assist such enterprise by every means in its power. The Embankment Act (VI B.C. of 1873) leaves ample power of initiation to the local authorities, and even minor obstructions, such as those described by Sir William Herschel in his note appended to the report of the Committee, may and ought to be removed under the provisions of that Act.

5. For the rest, all that Government can do is to warn its Public Works Department to see that in all projects for roads, careful attention is paid to this question of drainage, and if in any place it is found that existing roads and works injuriously affect the out-fall, such measures as are practicable must be taken to remedy the defect.

6. The thanks of Government are due to the members of the Committee, official and non-official, for the trouble they have taken in carrying out the

work assigned to them. It is not, however, necessary that they should continue their sittings.

ORDERED—That this resolution, together with the papers read above, (with the exception of Sanitation Collection I, for January, February, and March,) be published in the *Calcutta Gazette*.

ORDERED also that a copy of this resolution be forwarded to the Secretary to this Government in the Public Works Department for information, with special reference to the fifth paragraph, and to Rajah Digumber Mitter, C.S.I., and the Sanitary Commissioner for Bengal for information.

Also to the Board of Revenue and the Commissioner of the Burdwan Division for information.

By order of the Lieutenant-Governor of Bengal,

A. MACKENZIE,

*Offg. Secy. to the Govt. of Bengal.*

## LIBERALITY OF MAHARANEE RAJROOP KUAR OF TICORI.

No. 165RT. dated Yacht *Rhotas*, the 27th July 1877.

From—S. C. BAYLEY, Esq., C.S.I., Secy. to the Govt. of Bengal, Judicial Dept.,
To—The Commissioner of the Patna Division.

I AM directed to acknowledge the receipt of your letter No. 241J, dated the 16th instant, and in reply to say that, under the circumstances reported, and in compliance with your recommendation, the Lieutenant-Governor has been pleased to accord his sanction to the establishment, under the revised dispensary rules, of a class III, grade 3 dispensary at Ticori in the Gya district.

2. The Surgeon-General, Indian Medical Department, will be desired to appoint a native doctor to the charge of the dispensary, and to issue the necessary orders for the despatch to that institution of the usual supply of European medicines and instruments and of forms and registers.

3. As Maharanee Rajroop Kuar of Ticori has expressed her desire to make over at once the sum of Rs. 12,000 out of Rs. 30,000 which she proposes to bestow on the dispensary, a guarantee bond will not be necessary. I am, however, to request that you will be so good as to report the names of the gentlemen whom you would propose for appointment as members of the committee for the management of the dispensary.

4. I am at the same time to request you to convey to the Maharanee an expression of the Lieutenant-Governor's satisfaction at the liberality displayed by her. I am to add that this correspondence will be published in the *Calcutta Gazette*.

No. 241J, dated Bankipore, the 16th July 1877.

From—E. W. MOLONY, Esq., Commissioner of the Patna Division,
To—The Secretary to the Government of Bengal, Judicial Department.

WITH reference to Government order No. 815T, dated 26th ultimo, I have the honour to state that an application had been separately addressed by the Maharanee to me, and that on the receipt of it I had called upon the Magistrate of Gya to report on the probable public benefit that will be conferred by the gift, as well as on the proposed site and style of the building in which the dispensary is to be located.

2. From the report submitted by the Magistrate it appears that the establishment of a dispensary will supply a much felt want. With regard to the building, it is proposed to hire one for the present. The Maharanee proposes to make an endowment of Rs. 30,000, out of which she is ready to pay at once Rs. 12,000, which, when invested, will secure an income in the shape of interest just sufficient to allow of the opening of a class III, grade 3 dispensary. The remaining Rs. 18,000 she promises to pay on the completion of necessary arrangements for the erection of a suitable building, which she undertakes to provide at her own expense. When this Rs. 18,000 has been received the guaranteed income will come to Rs. 100 a month, and the dispensary will be raised to a higher grade.

3. In the meantime I beg to recommend that sanction of Government may be accorded to the establishment of a class III, grade 3 dispensary, with the guaranteed income of Rs. 40 per mensem from the interest on the Rs. 12,000 which the Maharanee is desirous of paying down at once.

4. I beg that the liberality of the Maharanee may receive the acknowledgment of Government.

5. The original letter of the Maharanee is herewith returned.

## Rainfall, Weather, and State and Prospects of the Crops.

*Statement showing Rainfall, Weather, and State and Prospects of the Crops in the different Districts of Bengal, as reported to Government during the week ending the 28th July 1877.*

| No. | District, and date of return. | Rainfall at Sudder Station in inches. | Character of the weather, state and prospects of the crops, and state of health at date. |
|---|---|---|---|
| | **BENGAL.** | | |
| | *Western Districts.* | | |
| 1 | Burdwan, July 28 '77 | 1·28 | The rainfall at Culna has been 1·84 inches, at Cutwa 2·56 inches, at Jehanabad 2·33 inches, and at Raneegunge 1·14 inches. The heavy rain at the end of last week has facilitated transplantation, which is now progressing more favourably. The *aous* paddy in Culna and Cutwa is doing well. The price of rice is considerably lower at Burdwan and Culna. Some fatal cases of cholera reported from Raneegunge. Return from Bood-bood not received. |
| 2 | Bankoora, ,, 28 ,, | 1·34 | No rain worth speaking of since 21st July. It is now threatening. It is wanted. No damage has yet been done. The rice seedlings are being planted out in the low lands. |
| 3 | Beerbhoom, ,, 28 ,, | ·67 | Weather—Very unseasonably bright and dry. There was no rain at all on the 26th, 27th, and 28th July. The week has been a bad one for the rice crops. Transplantation is very backward, and cannot be carried on till rain falls.* Hardly more than three weeks of the transplanting season remains. Prices are rising rather fast. |
| 4 | Midnapore, ,, 28 ,, | ·03 | Heavy rain has fallen in places but very partially. Prospects differ widely. In parts of the district the rainfall has been sufficient, and the prospects are very fair; in other places the want of rain is very seriously felt. Indigo will, it is apprehended, yield a very poor outturn. |
| 5 | Hooghly, ,, 28 ,, | ·24 | Weather—Dry, accompanied with slight rain. Transplantation of late rice is going on. Early rice has commenced to flower. More rain is very desirable to ensure that crop. Public health is normal. Cattle disease still prevails in two villages in thana Bullagur. |
| | Howrah, ,, 28 ,, | 4·32 | Weather—Cloudy and rainy. State and prospects of the crops continue to be good. |
| | *Central Districts.* | | |
| 6 | 24-Pergunnahs, July 30 '77 | 4·88 | Weather—Showery, with long fair intervals. Transplantation is going on. Public health in general is good. |
| 7 | Nuddea, ,, 28 ,, | ·48 | A little rain has fallen in most places. In the north of the district the harvesting of early rice has begun. All crops are promising, but rain is now required for late rice. Prices have fallen a little in the last few days. |
| 8 | Jessore, ,, 28 ,, | 2·72 | Weather—Seasonable. The crops are doing well but want more rain. The lowness of the rivers has been interfering with the manufacture of indigo and its conveyance from the fields to the vats. |
| 9 | Moorshedabad, ,, 28 ,, | 2·50 | Weather—Seasonable. The rainfall at Lalbagh has been 4·4 inches, at Rampore Hat 3·61 inches, and at Jungypore 6·25 inches. The general prospects are good. The heavy rain of the 24th July has enabled the cultivators to transplant *haimanti* rice seedlings; more rain is, however, wanted at a few places. The price of common rice is about a seer or two cheaper than last week. Health of the district is good. |
| 10 | Dinagepore, ,, 27 ,, | 7·68 | Heavy rain fell on three days, commencing from the 19th July. The fall at Roygunge up to 24th was 10·34 inches. The rain did much good to the *bhadoi* crop and jute, and facilitated cultivation for winter rice. The prospects of the crops could not be better. |
| 11 | Rajshahye, ,, 28 ,, | 2·80 | There has been a fair amount of rain during the week in all parts of the district. The prospects of the rice crops continue favourable. *Rops dhan* is being transplanted. |
| 12 | Rungpore, ,, 27 ,, | 3·60 | Weather—Steady rain during the week. 6·65 inches registered at Gaibunda, and 5·28 inches at Kurigram. The prospects of the crops are good. Jute has turned out well. The manufacture of indigo has commenced. Public health is remarkably good for this time of the year. |
| 13 | Bogra, ,, 28 ,, | 9·61 | Weather—Rainy at the beginning and fair towards the end of the week. The prospects of the standing crops continue to be favourable. Some *aous* plants in the jurisdiction of Gobail outpost have been submerged on account of heavy rain that has fallen during the week. Sesamum has been cut with a fair average outturn. The cutting of jute and *aous* rice is fast reaching completion. |

BURDWAN DIVN. PRESIDENCY DIVN. RAJSHAHYE AND COOCH BEHAR DIVN.

* Nearly an inch since telegraphed on 29th and 30th July.

| No. | District, and date of return. | Rainfall at Sudder Station in inches. | Character of the weather, state and prospects of the crops, and state of health at date. |
|---|---|---|---|
| **BENGAL.—(*Continued.*)** | | | |
| | ***Central Districts.*** | | |
| Rajshahi and Cooch Behar Divn. 14 | Pubna, July 28 '77 | 1·35 | Weather—Seasonable and rainy, and on the whole favourable for agricultural operations. State and prospects of the crops continue favourable. The water is gradually increasing. Cholera has entirely disappeared, but fever is still prevalent. |
| 15 | Darjeeling, „ 27 „ | 10·55 | There has been continued rain throughout the week both in the hills and the plains. The state of the crops is favourably reported of in all parts of the district. |
| 16 | Julpigoree, „ 28 „ | 4·65 | Weather—Rainy and seasonable. The river Teesta is still very high, and has overflowed its banks in some places. In most thanas about one-third of the entire paddy crop is transplanted. *Bhadoi* is entirely reaped in pergunnah Mynagoree; in other pergunnahs except Boda, where more rain is required, it is a good crop. Jute and sugarcane have turned out well. |
| | Cooch Behar, „ 26 „ | 9·88 | Weather—Cloudy and rainy, but without thunder; cool and fresh. 13·07 inches registered at Mekligunge, 11·83 inches at Mathabhanga, and 9·73 inches at Dinhatta. The rain has been most opportune. It has removed all anxiety, and if there be only enough and not too much hereafter, there may yet be a very good harvest. Public health is good. |
| | ***Eastern Districts.*** | | |
| Dacca Divn. 17 | Dacca, July 28 '77 | 7·66 | Weather—Seasonable. The rain on the 21st July was very heavy; since then alternate rain and sunshine, which is exactly what was wanted. The state and prospects of the crops are very favourable. The weather has been all that could be desired for the last fortnight. |
| 18 | Furreedpore, „ 28 „ | 1·98 | Weather—Fair. 2·54 inches of rain registered at Goalundo, and ·49 of an inch at Madaripore. There has been an average harvest of *aous*, but more rain is required for *amun*. Rivers are rising. |
| 19 | Backergunge, „ 26 „ | 2·51 | All is well. The prospects are good. |
| 20 | Mymensingh, „ 27 „ | 24·13 | Weather—Rainy till 23rd July; fair and sunny since then. In the head-quarters sub-division the heavy rain has injured the *amun* seedlings and standing *aous*, also the roads and bridges. Elsewhere the rain did unmitigated good. |
| 21 | Tipperah, „ 27 „ | 4·65 | Weather—Heavy rain during the first four days of the week, clear and fine during the last three days. 7·29 inches registered at Brahmunbariah. The *aous dhan* harvest has commenced, and the outturn will be a fair one, though not so large as usual. The prospects of the winter rice crop are good owing to the late heavy rain. Average price of rice is from 16 to 17 seers per rupee. |
| Chittagong Divn. 22 | Chittagong, „ 26 „ | 9·59 | Weather—Continuous rain till 22nd July; since fair. The *aous* crop is almost reaped. Transplantation of the *amun* crop is going on. Cholera is reported from Teknaaf. |
| 23 | Noakholly, „ 26 „ | 21·33 | Weather—Cool. With the exception of two days, it rained every day during the week. In some places the very early rice is being reaped. Transplantation of the late rice is going on. Health of the district has much improved. |
| 24 | Chittagong Hill Tracts, „ 24 „ | 10·45 | There have been heavy falls of rain throughout the week, with occasional sunshine, and the prospects of the paddy and cotton crops have much improved. It has been reported from the Upper Chengri Valley that in early *jooms* paddy is ripening, and is being gathered by people whose stock of grain has been exhausted. In the Fenny Valley rice is being imported from Tipperah, and is sold at 16 kutcha or 13½ pucca seers per rupee. |
| | Hill Tipperah, „ 25 „ | 4·52 | Weather—Rainy and cloudy throughout the week. There has been enough rainfall to enable the cultivators to complete the transplantation of late rice. All crops are doing well. |
| **BEHAR.** | | | |
| Patna Divn. 25 | Patna, July 28 '77 | 2·28 | Weather—Hot and close. Clouds hanging about, but no rain since 23rd July. Rain is much wanted. Health is generally good. |
| 26 | Gya, „ 28 „ | ·06 | Weather—Hot and generally bright, but sometimes clouded over. The maximum reading of the thermometer in the shade was 97·6°. 3·2 inches of rain registered at Nowada. ·92 of an inch at Jehanabad, and ·13 of an inch at Aurungabad. Aurungabad and the sudder sub-division are worse off than Jehanabad and Nowada. Rain is urgently wanted to the south and west and in the central tracts, but more or less all over the district. The greatest injury has been done to *marua*. In parts of Aurungabad the crop is reported as being thoroughly scorched up. Grasshoppers are still doing injury in that quarter, though they have disappeared in Jehanabad. |
| 27 | Shahabad, „ 28 „ | ·35 | Weather—Cloudy and hot. The want of rain is severely felt throughout the district. In most places the people can hold on, as the rice has not yet been transplanted from the seed beds. The price of cereals has increased considerably, and is steadily rising, principally in consequence of the enormous exportation by river. The rail cannot take more, the goodsheds and the station being crowded with stacked bags. In the irrigable area the people in great part still will not take canal water, although Sone water just now would both manure and irrigate the land. |

| No. | District and date of return. | Rainfall at Sudder Station in inches. | Character of the weather, state and prospects of the crops, and state of health at date. |
|---|---|---|---|
| **BEHAR.—(*Continued.*)** | | | |
| 28 | Durbhunga, July 28 '77 | 7·01 | There was heavy rain in the beginning of the week, and afterwards fine weather. The prospects of the crops at present are satisfactory. Cholera cases still occur, but deaths from the disease are comparatively few. |
| Patna Div. 29 | Muzufferpore, „ 28 „ | 1·31 | Weather—Occasionally cloudy and generally favourable for the *bhadoi* and rice crops. 5·79 inches of rain have fallen at Seetamurhee. |
| Patna Div. 30 | Sarun, „ 28 „ | 2·35 | Weather—Hot and close. ·32 of an inch of rain registered at Sewan. There has been scanty rain in most parts of the district, but heavy rain is wanted everywhere. The *bhadoi* crops are backward, and the transplantation of *aghani* rice is at a standstill for want of sufficient rain. |
| Patna Div. 31 | Chumparun, „ 28 „ | 4·02 | Weather—Cloudy, with continued showers. The prospects of the crops are good. The rain, which has been general, has been of the greatest benefit, and for the present all anxiety has been dispelled. |
| Bhagulpore Div. 32 | Monghyr, „ 28 „ | 2·70 | Weather—Cloudy, but little rain. 3·04 inches registered at Begu Sorai and 3·50 inches at Jamui. |
| Bhagulpore Div. 33 | Bhagulpore, „ 30* „ | 6·61 | Weather—More seasonable in the north than in the south. *Murwa* and early *bhadoi* have somewhat suffered, but prospects are generally good. Naradiggur has had a good fall of rain. |
| Bhagulpore Div. 34 | Purneah, „ 28 „ | 5·37 | Weather—Generally favourable. 5·74 inches of rain registered at Kishengunge, and 8·57 inches at Arrareah. State and prospects of the crops are favourable. Great damage has been done in the west of the district by a heavy flood in the Koosi river. |
| Bhagulpore Div. 35 | Maldah, „ 28 „ | 2·07 | Moderate rain has fallen all over the district, and the prospects of the crops are fair. |
| Bhagulpore Div. 36 | Sonthal Perghs. „ 28 „ | ·42 | There has been rain everywhere, but the fall is not generally sufficient except in Godda, where 4·09 inches are registered. 2·48 inches fell at Deoghur and 1·5 inches at Rajmehal. The reports are very favourable from the Godda sub-division, but in other parts of the district heavy rain is anxiously looked for, and if it come soon, all crops are likely to be very good. |
| **ORISSA.** | | | |
| Orissa Div. 37 | Cuttack, July 28 '77 | ·95 | Weather—Clear and hot. Rainfall insufficient for agricultural purposes, and grumblers are beginning to say that the crops have suffered in consequence, but reports from the sub-divisions are favourable. Prices of food-grains, especially of rice, are still high, but slightly cheaper. A few cases of cholera here and there; otherwise public health is good. |
| Orissa Div. 38 | Pooree, „ 26 „ | ·12 | Weather—Hot and cloudy. *Sarad* and *beali* paddy plants are suffering from want of rain. The miscellaneous crops, such as *mundia* (a small cereal), sugarcane, and *arhar*, are fair at present, but for them also rain will soon be wanted. Some breaches in the embankments have been filled up. Cholera has disappeared, though the pilgrims have not yet gone out. |
| Orissa Div. 39 | Balasore, „ 27 „ | ·60 | The condition of the young crop is still good, but the higher lands are drying up and more rain is required. Public health is good. |
| **CHOTA NAGPORE.** *South-West Frontier Agency.* | | | |
| 40 | Hazareebagh, July 27 '77 | 2·94 | Weather—Unseasonable; hot and hazy. Prospects doubtful. No *dhan* is as yet planted out owing to want of rain. The seedlings are turning yellow and sickly. No absolute injury has yet been done, but a few days more without rain will be ruinous to the rice and *murwa* crops. The Indian corn is however doing well. |
| 41 | Lohardugga, „ 28 „ | ·28 | Weather—Unseasonable. The *bhadoi* paddy, the broadcast sown part of the main paddy crop, and the seedlings in the nurseries, are beginning to suffer from want of rain. Very slight showers are reported to have fallen at Palamow during the early part of the week preceding 24th July, measuring ·65 of an inch. Since then no rain, sky clear, and wind dry and warm. No actual injury is, however, done to the crops. The *bhadoi* is progressing favourably. The rice seedlings are advancing to maturity; they must be planted out almost immediately or they will be lost. But transplantation is impossible at present, for there is no sufficient supply of water in the reservoirs, and want of rain prevents preparation of the ground. |
| 42 | Singbhoom, „ 27 „ | 1·79 | Weather—Seasonable. The prospects of the crops continue favourable, but rain is now needed for the transplanted seedlings to recover. The district is reported healthy. |
| 43 | Manbhoom, „ 28 „ | 1·97 | Weather—Too dry for this season of the year. State and prospects of the crops are favourable as yet, but rain is wanted, especially in the north of the district. The price of rice has risen owing to extensive exportation. |

* Telegram of 30th July shows rainfall for week ending 29th inst.

Published for general information.

CALCUTTA, STATISTICAL DEPT.,
*The 31st July* 1877.

A. MACKENZIE,
*Offg. Secy. to the Govt. of Bengal.*

# Weekly Report of Rainfall compiled at the Meteorological Reporter's Office.

| Divisions. | Districts. | Stations. | Rain from 8th to 14th July 1877. | Rain from 15th to 21st July 1877. | Rain from 1st January 1877. Inches. | Rain from 1st January 1877. Up to date. | Remarks. |
|---|---|---|---|---|---|---|---|
| BENGAL. | | | Inches. | Inches. | | 1877. | |
| | Western Districts. | | | | | | |
| Burdwan. | Burdwan ... ... | Burdwan ... ... | 2·20 | 3·45 | 23·09 | 21st July | |
| | | Cutwa ... ... | 3·56 | 2·52 | 28·98 | ditto ... | Not recorded 1st to 7th July. |
| | | Culna ... ... | 3·06 | 2·46 | 29·43 | ditto | |
| | | Bood-Bood ... ... | 3·61 | 4·32 | 22·54 | ditto | |
| | | Raneegunge ... | 3·99 | 4·56 | 23·10 | ditto | |
| | | Jehanabad ... ... | 5·96 | 4·73 | 40·25 | ditto | |
| | Bankoora ... ... | Bankoora ... ... | 4·27 | 2·80 | 22·78 | ditto | |
| | Beerbhoom ... ... | Sooree ... ... | 2·97 | 3·08 | 22·50 | ditto | |
| | | Hetampore ... ... | 2·02 | 5·34 | 25·85 | ditto | |
| | | Roypore ... ... | 0·78 | 2·61 | 20·84 | ditto | |
| | Midnapore ... ... | Midnapore ... ... | 2·47 | 0·23 | 27·90 | ditto | |
| | | Tumlook ... ... | 3·55 | 3·02 | 22·86 | ditto | |
| | | Ghattal ... ... | 10·01 | 2·41 | 35·00 | ditto | |
| | | Contai { Dy. Collr.'s Office... | 8·29 | 3·01 | 42·06 | ditto | |
| | | Contai { Exe. Engr.'s Office | 6·03 | 2·83 | 33·52 | ditto | |
| | Hooghly ... ... | Hooghly ... ... | 1·57 | 2·59 | 30·24 | ditto | |
| | | Serampore ... ... | 2·13 | 4·04 | 31·12 | ditto | |
| | Howrah ... ... | Howrah ... ... | 2·82 | 4·84 | 30·63 | ditto | |
| | | Maheshtala ... ... | Not recd. | 4·88 | 26·41 | ditto ... | Not recorded 8th to 14th July. |
| | Central Districts. | | | | | | |
| Presidency. | 24-Pergunnahs ... | Saugor Island ... ... | 11·20 | 2·80 | 41·74 | ditto | |
| | | Calcutta ... ... | 3·10 | 4·67 | 28·78 | ditto | |
| | | Alipore { Dispensary ... | 3·74 | 5·19 | 32·71 | ditto | |
| | | Alipore { Jail ... ... | 3·58 | 5·30 | 32·15 | ditto | |
| | | Busseerhat ... ... | 4·22 | 2·20 | 33·96 | ditto | |
| | | Baraset ... ... | 3·21 | 3·26 | 30·49 | ditto | |
| | | Diamond Harbour ... | 4·46 | 2·11 | 40·34 | ditto | |
| | | Barripore ... ... | 6·57 | 3·14 | 33·34 | ditto | |
| | | Satkhira ... ... | 1·23 | 2·33 | 42·46 | ditto | |
| | | Barrackpore ... ... | 2·25 | 4·21 | 32·24 | ditto | |
| | | Dum-Dum ... ... | 1·72 | 4·67 | 26·83 | ditto | |
| | | Kishnaghur ... ... | 2·84 | 5·36 | 44·41 | ditto | |
| | | Bongong ... ... | 2·74 | 0·60 | 38·02 | ditto | |
| | Nuddea ... ... | Meherpore ... ... | 1·11 | 1·93 | 30·84 | ditto | |
| | | Chooadanga ... ... | 1·39 | 2·10 | 30·82 | ditto | |
| | | Kooshtea ... ... | 0·90 | 4·05 | 42·70 | ditto | |
| | | Ranaghat ... ... | 3·55 | 1·87 | 36·00 | ditto | |
| | | Jessore ... ... | 1·83 | 1·36 | 33·49 | ditto | |
| | | Narail ... ... | 1·81 | 1·88 | 31·48 | ditto | |
| | Jessore ... ... | Khoolna ... ... | 1·95 | 2·22 | 39·92 | ditto | |
| | | Jhenida ... ... | 0·54 | 4·38 | 32·95 | ditto | |
| | | Bagirhat ... ... | 1·90 | 1·99 | 52·35 | ditto | |
| | | Magoorah ... ... | 1·34 | 1·93 | 41·08 | ditto | |
| | | Berhampore ... ... | 3·04 | 1·84 | 26·15 | ditto | |
| | | Rampore Haut ... ... | 3·12 | 2·02 | 22·52 | ditto | |
| | | Lalbagh ... ... | 3·33 | 2·07 | 30·05 | ditto | |
| | Moorshedabad ... | Jungypore ... ... | 1·59 | 3·04 | 20·70 | ditto | |
| | | Azimgunge ... ... | 0·80 | 3·91 | 22·52 | ditto | |
| | | Lalgolla ... ... | 1·93 | 2·35 | 21·29 | ditto | |
| | | Kandee ... ... | 5·30 | 2·15 | 28·41 | ditto | |
| Rajshahye. | Dinagepore ... ... | Dinagepore ... ... | 0·95 | 3·00 | 29·19 | ditto | |
| | | Raigunge ... ... | 1·50 | 6·81 | 35·09 | ditto | |
| | Maldah ... ... | Maldah ... ... | 2·87 | 2·19 | 27·92 | ditto | |
| | | Chanchal ... ... | 3·10 | 2·82 | 25·53 | ditto | |
| | Rajshahye ... ... | Baulcah ... ... | 0·54 | 0·80 | 32·06 | ditto | |
| | | Nattore ... ... | 0·90 | 1·45 | 40·19 | ditto | |
| | Rungpore ... ... | Rungpore ... ... | 2·42 | 1·56 | 47·83 | ditto | |
| | | Bhabanigunge ... ... | 1·07 | 2·68 | 29·93 | ditto | |
| | | Kungram ... ... | 1·61 | 6·68 | 46·41 | ditto | |
| | | Sagdogra ... ... | Not recorded. | | 24·08 | 2nd June | |
| | Bogra ... ... | Bogra ... ... | 1·29 | 2·06 | 39·94 | 21st July | |
| | | Sherpore ... ... | 1·41 | 4·02 | 31·90 | ditto | |
| | | Nowkhilla ... ... | 1·05 | 1·98 | 26·79 | ditto | |
| | | Panchabibi ... ... | 2·55 | 4·48 | 30·41 | ditto | |
| | | Halulya ... ... | 2·97 | 3·70 | 33·04 | ditto | |
| | Pubna ... ... | Pubna ... ... | 1·06 | 0·71 | 43·26 | ditto | |
| | | Serajgunge ... ... | 2·06 | 3·15 | 31·70 | ditto | |
| Cooch Behar. | Darjeeling ... ... | Darjeeling { Telegraph Office | 7·30 | Not recd. | 40·07 | 14th July | |
| | | Darjeeling { Hospital ... | 7·89 | 13·25 | 59·87 | 21st July | |
| | Julpigoree ... ... | Julpigoree ... ... | 0·05 | 13·68 | 54·84 | ditto | |
| | | Bodah ... ... | 0·20 | 10·75 | 43·36 | ditto | |
| | | Buxa—Civil Surgeon's Office | 0·70 | 16·86 | 107·82 | ditto | |
| | | Titalya ... ... | 0·08 | 16·36 | 53·64 | ditto | |
| | Cooch Behar Tributary States. | Cooch Behar ... ... | 1·28 | 9·98 | 55·36 | ditto | |

| Divisions. | Districts. | Stations. | Rain from 8th to 14th July 1877. | Rain from 15th to 21st July 1877. | Rain from 1st January 1877. | | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | | | Inches. | Up to date. | |
| BENGAL—(*Continued.*) | | | | | | | |
| | EASTERN DISTRICTS. | | Inches. | Inches. | | 1877. | |
| DACCA. | Dacca ... ... | Dacca... { Telegraph Office | 3·01 | Not recd. | 41·00 | 14th July | |
| | | Dacca... { Hospital ... | 2·28 | 9·92 | 53·78 | 21st July | |
| | | Moonsheegunge ... ... | 2·61 | 12·18 | 81·49 | ditto | |
| | | Manickgunge ... ... | 1·39 | 8·30 | 46·53 | ditto | |
| | Furreedpore ... ... | Furreedpore ... ... | 0·77 | 0·81 | 51·70 | ditto | |
| | | Goalundo ... ... | 0·49 | 3·87 | 41·18 | ditto | |
| | | Madaripore ... ... | 3·41 | 1·05 | 54·65 | ditto | |
| | Backergunge ... | Burrisal ... ... | 3·31 | 3·40 | 59·56 | ditto | |
| | | Perozepore ... ... | 1·50 | 4·95 | 64·81 | ditto | |
| | | Patookhally ... ... | 3·03 | 6·01 | 65·38 | ditto | |
| | | Bhola ... ... | 6·19 | 7·58 | 62·29 | ditto .. | From 4th February 1877. |
| | Mymensingh ... | Mymensingh ... ... | 1·44 | 15·59 | 51·97 | ditto | |
| | | Jamalpore ... ... | 2·31 | 5·20 | 84·30 | ditto | |
| | | Atia ... ... | 3·02 | 1·70 | 39·41 | ditto | |
| | | Kishoregunge ... ... | 1·34 | 2·74 | 41·12 | ditto | |
| CHITTAGONG. | Chittagong ... ... | Chittagong { Telegraph Office | 2·00 | 9·70 | 52·10 | ditto | |
| | | Chittagong { Jail ... | 1·03 | 12·31 | 50·54 | ditto | |
| | | Cox's Bazar ... ... | 4·13 | 18·68 | 72·28 | ditto | |
| | Noakholly ... ... | Noakholly ... ... | 3·34 | 20·32 | 74·64 | ditto | |
| | | Feuny ... ... | 3·43 | 15·18 | 72·98 | ditto | |
| | Tipperah ... ... | Comillah ... ... | 4·53 | 8·67 | 58·99 | ditto | |
| | | Brahmunbariah ... ... | 2·72 | 4·63 | 50·19 | ditto | |
| | Chittagong Hill Tracts | Rungamatee Hill ... | 2·60 | 11·04 | 49·95 | ditto | |
| | Hill Tipperah ... ... | Hill Tipperah ... ... | 1·07 | 3·57 | 43·68 | ditto | |
| BEHAR. | | | | | | | |
| PATNA. | Patna ... ... | Patna ... ... | 0·36 | 1·26 | 15·27 | ditto | |
| | | Behar ... ... | 3·19 | 4·24 | 26·77 | ditto | |
| | | Barh ... ... | 0·71 | 3·20 | 23·43 | ditto | |
| | | Dinapore ... { Jail ... | 0·89 | 1·30 | 10·63 | ditto | |
| | | Dinapore ... { Cantonment... | 0·89 | 1·24 | 10·37 | ditto | |
| | Gya ... ... | Gya ... ... | 1·75 | 1·18 | 21·29 | ditto | |
| | | Nowadah ... ... | 1·94 | 2·30 | 24·11 | ditto ... | Not recorded 18th to 24th Feb. |
| | | Aurungabad ... ... | 1·61 | 0·23 | 10·54 | ditto ... | Ditto 19th Jan. and 4th to 10th February. |
| | | Jahanabad ... ... | 1·98 | 2·53 | 16·23 | ditto | |
| | Shahabad ... ... | Arrah ... ... | 1·72 | 0·64 | 17·86 | ditto | |
| | | Sasseram ... ... | Not recd. | 0·07 | 11·05 | ditto ... | Not recorded 8th to 14th July. |
| | | Buxar ... ... | 1·38 | 0·34 | 11·03 | ditto | |
| | | Bhubooah ... ... | 1·82 | 0·73 | 13·36 | ditto | |
| | Monufferpore... ... | Monufferpore ... ... | 0·90 | 3·15 | 11·09 | ditto | |
| | | Hajeepore ... ... | 2·71 | 3·55 | 19·02 | ditto | |
| | | Seetamurhee ... ... | 0·83 | 4·17 | 16·99 | ditto | |
| | Durbhunga ... ... | Durbhunga ... ... | 0·99 | 9·27 | 21·85 | ditto | |
| | | Mudhoobunnee ... ... | 1·48 | 5·98 | 16·71 | ditto | |
| | | Tajpore ... ... | 0·70 | 5·03 | 15·22 | ditto | |
| | Sarun ... ... | Chupra ... ... | 2·74 | 1·41 | 15·57 | ditto | |
| | | Sewan ... ... | 1·70 | 1·18 | 19·25 | ditto | |
| | Chumparun ... ... | Motiharee ... ... | 0·95 | 3·57 | 13·92 | ditto | |
| | | Bettiah ... ... | 0·13 | 4·70 | 22·43 | ditto | |
| | | Segowlie ... ... | 0·32 | 1·33 | 17·05 | ditto | |
| BHAGULPORE. | Monghyr ... ... | Monghyr ... ... | 0·94 | 7·04 | 20·10 | ditto | |
| | | Begoosserai ... ... | 1·05 | 2·91 | 17·51 | ditto | |
| | | Jamooee ... ... | 0·71 | 3·58 | 17·98 | ditto | |
| | Bhagulpore ... ... | Bhagulpore ... ... | 2·04 | 8·12 | 27·11 | ditto | |
| | | Soopool ... ... | 0·60 | 1·92 | 21·39 | ditto | |
| | | Muddehpoora ... ... | 1·60 | 2·10 | 17·09 | ditto | |
| | | Banka ... ... | 2·12 | 4·72 | 18·97 | ditto | |
| | | Sonburza ... ... | 1·36 | 3·16 | 17·30 | ditto | |
| | Purneah ... ... | Purneah ... ... | 1·79 | 5·93 | 25·31 | ditto | |
| | | Kissengunge ... ... | 0·64 | 3·46 | 24·73 | ditto | |
| | | Arrareah ... ... | 0·13 | 6·69 | 24·05 | ditto | |
| | Sonthal Pergunnahs | Nya Doomka ... ... | 2·29 | 4·14 | 29·33 | ditto | |
| | | Rajmehal ... ... | 2·10 | 2·80 | 23·50 | ditto | |
| | | Deoghur ... ... | 2·32 | 3·61 | 22·99 | ditto ... | Not recorded 1st to 7th July. |
| | | Godda ... ... | 2·26 | 4·19 | 16·92 | ditto | |

| Divisions. | Districts. | Stations. | Rain from 8th July to 14th July 1877. | Rain from 14th July to 21st July 1877. | Rain from 1st January 1877. | | Remarks. |
|---|---|---|---|---|---|---|---|
| | | | | | Inches. | Up to date. | |
| ORISSA. | | | Inches. | Inches. | | 1877. | |
| Orissa. | Cuttack ... ... | Cuttack... { Telegraph Office | 5·91 | 0·10 | 22·60 | 21st July | |
| | | Hospital ... | 4·88 | Not recd. | 23·32 | 14th July | |
| | | Jajpore ... ... | 4·40 | ditto | 26·20 | ditto | |
| | | Kendraparah ... ... | 8·10 | ditto | 29·90 | ditto | |
| | | Jagatsingpore ... ... | 4·40 | ditto | 16·95 | ditto | |
| | | False Point ... ... | 8·00 | 0·05 | 49·90 | 21st July | |
| | Pooree ... ... | Pooree ... ... | 3·74 | 0·11 | 20·42 | ditto | |
| | | Khurdah ... ... | 4·15 | 0·62 | 24·69 | ditto | |
| | Balasore ... ... | Balasore... { Exc. Engr.'s Office | 17·85 | 0·58 | 43·66 | ditto | |
| | | Collector's Office | 16·39 | 0·68 | 45·73 | ditto | |
| | | Bhadrack ... ... | 7·51 | 0·18 | 39·24 | ditto | |
| | | Jellasore ... ... | 11·65 | 0·44 | 37·82 | ditto | |
| | | Sorah ... ... | 11·36 | Nil | 37·78 | ditto | |
| | | Chandbally ... ... | 7·67 | 0·40 | 31·07 | ditto | |
| | Cuttack Tributary Mehals | Sumbalpore ... ... | 6·81 | 0·33 | 37·01 | ditto | |
| | CHOTA NAGPORE. | | | | | | |
| | South-Western Frontier Agency. | | | | | | |
| | Hazareebagh ... | Hazareebagh... { Jail ... | 2·30 | 5·16 | 25·24 | ditto | |
| | | Dispensary | 2·48 | 4·99 | 26·80 | ditto | |
| | | Pachamba ... ... | 5·65 | 2·73 | 23·52 | ditto | |
| | Lohardugga ... ... | Ranchee ... ... | 2·08 | 1·70 | 26·81 | ditto | |
| | | Palamow ... ... | 3·06 | 0·65 | 20·56 | ditto | |
| | Singbhoom ... ... | Chyebasee ... ... | 6·96 | 1·89 | 40·04 | ditto | |
| | Manbhoom ... ... | Purulia ... ... | 4·79 | 3·57 | 32·58 | ditto | |
| | | Goviudpore ... ... | 2·99 | 2·24 | 18·93 | ditto | |
| | ASSAM & ADJACENT HILLS. | | | | | | |
| | Sylhet ... ... | Sylhet ... ... | Not recd. | 10·83 | 71·74 | ditto | Not recorded 8th to 14th July 1877. |
| | Sibsagar ... ... | Sibsagar ... ... | 3·73 | Not recd. | 48·21 | 14th July | |
| | | Golaghat ... ... | 4·34 | ditto | 43·22 | ditto | |
| | | Jorhat ... | 2·89 | ditto | 37·80 | ditto | |
| | | Deopanie ... ... | 4·73 | ditto | 45·59 | ditto | |
| | | Hattie Pootie ... ... | 3·74 | ditto | 44·58 | ditto | |
| | | Mauzengah ... ... | 2·82 | ditto | 35·69 | ditto | |
| | | Nazira ... ... | 3·17 | ditto | 37·12 | ditto | |
| | | Suntock ... ... | 3·31 | ditto | 43·26 | ditto | |
| | | Cherideo ... ... | 1·73 | ditto | 41·16 | ditto | |
| | | Akyab ... ... | 13·20 | 7·80 | 72·11 | 21st July | |
| | Rajpootana ... | Alwar ... ... | Not recorded. | | Nil | 26th May | |
| | | Jaipur ... ... | 0·09 | 0·57 | 6·77 | 21st July | |
| | | Sambhar ... ... | Nil | Nil | 6·15 | ditto | |

CALCUTTA,
*The 28th July* 1877.

JOHN ELIOT, M.A.,
*Meteorological Reporter to the Govt. of Bengal.*

# Abstract of Observations as received in the Meteorological Office, Calcutta, during the month of May 1877.

*N.B.—The Barometric data are reduced for temperatures and not for height above sea-level.*

| STATIONS. | Height above sea-level. | BAROMETER. Mean. | BAROMETER. Mean of 10 hours. | BAROMETER. Mean of 16 hours. | BAROMETER. Range. | RADIATION THERMOMETERS. Solar. Mean. | Solar. Above max. in shade. | Solar. Max. Day. | Solar. Max. ○ | Gross Nocturnal. Mean. | Gross Nocturnal. Below min. in shade. | Gross Nocturnal. Min. Day. | Gross Nocturnal. Min. ○ | TEMPERATURE OF AIR. Mean of max. | Mean daily range. | Mean of min. | Mean. | Mean of 10 hours. | Mean of 16 hours. | Highest Max. Day. | Highest Max. ○ | Absolute range. | Lowest Min. Day. | Lowest Min. ○ | VAPOUR TENSION. Mean. | From minima. | Mean of 10 hours. | Mean of 16 hours. | HUMIDITY. Mean. | From maxima. | Mean of 10 hours. | Mean of 16 hours. | RAIN-FALL. Inches. | Number of days. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Seebsaugor ... | 332 | 29·457 | 29·517 | 29·395 | ·122 | 139·6 | 55·4 | 31st | 139·6 | 68·0 | 2·1 | 10th | 63·4 | 84·2 | 14·1 | 70·1 | 76·0 | 77·4 | 81·7 | 29th | 96·1 | 31·2 | 10th | 64·9 | ... | ·698 | ·768 | ·773 | ... | 94 | 82 | 72 | 13·01 | 21 |
| Goalpara ... | 386 | ·365 | ·437 | ·302 | ·125 | 139·7 | 54·4 | 28th | 152·7 | 66·7 | 4·2 | 5th | 63·6 | 85·3 | 14·4 | 70·9 | 77·2 | 78·7 | 83·2 | 31st | 92·3 | 26·0 | 8th | 66·3 | ... | ·711 | ·812 | ·804 | ... | 94 | ■ | 71 | 15·25 | 22 |
| Darjeeling ... | 6,912 | 23·361 | 23·400 | 23·332 | ·068 | 127·0 | 60·3 | 30th | 143·1 | 44·4 | 7·1 | 16th | 38·0 | 66·7 | 13·2 | 53·5 | 58·7 | 60·6 | 61·7 | 29th | 74·3 | 27·0 | 9th | 47·9 | ... | ·360 | ·436 | ·426 | ... | 88 | 82 | 83 | 6·22 | 15 |
| Purneah ... | 125 | 29·59 | 29·656 | 29·517 | ·138 | 150·5 | 55·5 | 13th | 158·2 | 69·6 | 3·6 | 2, 3, 9, & 10th | 64·4 | 95·0 | 21·3 | 73·7 | 83·8 | 85·9 | 91·3 | 14th | 102·9 | 35·7 | 6th | 67·2 | ... | ·759 | ·780 | ·762 | ... | 91 | 64 | 53 | 7·97 | 10 |
| Durbhunga ... | 166·32 | ·426 | ·477 | ·375 | ·102 | 153·1 | 59·8 | 4th | 164·2 | 68·7 | 6·4 | 9th | 60·2 | 92·1 | 17·2 | 74·9 | 83·3 | 88·0 | 91·7 | 15th | 101·8 | 34·4 | 9th | 67·4 | ... | ·735 | ·774 | ·702 | ... | 85 | ■ | 49 | 2·86 | 11 |
| Patna ... | 179 | ·511 | ·573 | ·443 | ·125 | 159·9 | 59·9 | 15th | 168·4 | 68·8 | 7·9 | 9th | 59·2 | 100·0 | 23·5 | 76·5 | 87·3 | 90·2 | 95·2 | 16 & 17th | 103·4 | 40·1 | 9th | 64·3 | ... | ·892 | ·698 | ·621 | ... | 76 | 50 | 41 | 5·45 | 9 |
| Gya ... | 347 | ·343 | ·393 | ·299 | ·113 | 151·4 | 50·9 | 15th | 163·4 | 70·8 | 5·6 | 2 & 9th | 62·1 | 100·6 | 24·1 | 76·4 | 88·6 | 93·6 | 97·5 | 12th | 109·2 | 40·1 | 2 & 9th | 69·1 | ... | ·693 | ·944 | ·989 | ... | 77 | 63 | 57 | 11·19 | 8 |
| Hazareebagh ... | 2,010 | 27·737 | 27·779 | 27·698 | ·091 | 153·3 | 58·0 | 18th | 174·4 | 67·7 | 5·1 | 3rd | 59·4 | 94·3 | 21·5 | 72·8 | 83·5 | 88·2 | 91·2 | 24th | 101·5 | 32·5 | 9th | 64·0 | ·491 | ·530 | ·467 | ·437 | 45 | 66 | 37 | 33 | 2·24 | 19 |
| Berhampore ... | 66·45 | 29·647 | 29·704 | 29·581 | ·123 | 168·1 | 58·9 | 30th | 170·2 | 72·7 | 4·0 | 2nd | 65·4 | 99·2 | ·22·5 | 76·7 | 84·7 | 90·5 | 94·3 | 24th | 103·7 | 34·9 | 3rd | 69·9 | ... | ·741 | ·789 | ·672 | ... | 81 | ■ | 44 | 1·89 | 5 |
| Burdwan ... | 99·09 | ·621 | ·678 | ·555 | ·123 | 153·4 | 54·1 | 12th | 167·3 | 73·9 | 4·4 | 15th | 64·0 | 99·3 | 22·7 | 76·6 | 85·5 | 90·7 | 96·7 | 12th | 109·2 | 33·1 | 9th | 70·1 | ... | ·793 | ·879 | ·801 | ... | 86 | 69 | 48 | 5·12 | 11 |
| Jessore ... | 20 | ·708 | ·757 | ·652 | ·105 | 149·8 | 55·2 | 30th | 159·3 | 72·8 | 3·9 | 1 & 27th | 68·3 | 93·2 | 17·7 | 76·2 | 82·5 | 87·5 | 89·4 | 23rd | 101·2 | 34·7 | 3rd | 66·5 | ... | ·813 | ·975 | ·929 | ... | 90 | 75 | 68 | 7·87 | 17 |
| Dacca ... | 35 | ·718 | ·765 | ·665 | ·100 | 158·3 | 67·3 | 8 & 20th | 166·8 | 70·6 | 4·9 | 1st | 61·3 | 91·3 | 16·0 | 75·3 | 81·5 | 87·2 | 87·3 | 13th | 95·3 | 26·0 | 1st | 63·3 | ... | ·792 | ·930 | ·898 | ... | ■ | 72 | 69 | 5·38 | 21 |
| Silchar ... | 87·4 | ·702 | ·761 | ·640 | ·121 | 147·2 | 61·8 | 11th | 160·2 | 69·0 | 2·9 | 5th | 62·1 | 85·4 | 13·5 | 71·9 | 79·6 | 81·6 | 85·1 | 28th | 94·6 | 28·3 | 8th | 66·3 | ... | ·724 | ·822 | ·814 | ... | 92 | 77 | 60 | 18·29 | 19 |
| Chittagong ... | 90 | ·696 | ·746 | ·646 | ·099 | 143·6 | ... | 17th | 159·3 | 61·4 | 13·7 | 27th | 58·5 | ... | ... | 75·1 | ... | 86·8 | 88·0 | ... | ... | ... | 27th | 67·8 | ... | ·746 | ·897 | ·914 | ... | 85 | 71 | 68 | 5·09 | 10 |
| Dumagree ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 91·6 | 19·3 | 72·3 | ... | 81·4 | 88·6 | 14th | 96·0 | 22·9 | 5th | 67·1 | ... | ... | ... | ... | ... | ... | ... | 8·30 | 13 |
| Calcutta (Alipore.) | 21·38 | ·724 | ·769 | ·658 | ·111 | 152·3 | 56·4 | 6th | 160·2 | 73·4 | 3·7 | 7th | 66·2 | 95·9 | 18·9 | 77·0 | 82·8 | 88·6 | 92·3 | 25th | 103·1 | 32·8 | 9th | 70·3 | ·872 | ·823 | ·853 | ·810 | 77 | 88 | 63 | 54 | 5·06 | 11 |
| Saugor Island | 6 | ·727 | ·777 | ·679 | ·098 | 149·0 | 59·3 | 1st | 157·4 | 75·8 | 3·9 | 7th | 68·4 | 89·7 | 10·0 | 79·7 | 85·5 | 87·5 | 88·6 | 28th | 92·9 | 21·9 | 9th | 71·0 | ·993 | ·882 | 1·006 | 1·033 | 81 | 87 | 77 | 76 | 5·36 | 9 |
| Cuttack ... | 80 | ·602 | ·712 | ·491 | ·121 | ... | ... | ... | ... | 70·7 | 7·7 | 8th | 62·2 | 100·3 | 21·9 | 78·4 | 89·0 | 91·1 | 96·2 | 26th | 110·5 | 40·7 | 3rd | 69·8 | ... | ·896 | ·821 | ·761 | ... | 92 | 54 | 47 | 8·05 | 8 |
| False Point ... | 18·7 | ·747 | ·792 | ·698 | ·094 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 84·8 | ... | 86·6 | 86·7 | ... | ... | ... | ... | ... | ·993 | ... | 1·008 | 1·034 | 83 | ... | 80 | 81 | 4·15 | 8 |
| Vizagapatam ... | 31 | ·732 | ·764 | ·686 | ·099 | 164·3 | 27·3 | 27th | 180·5 | ... | ... | ... | ... | 89·7 | 5·3 | 84·4 | 87·5 | 88·8 | 88·9 | 27th | 100·5 | 20·9 | 20th | 79·6 | ·924 | ·693 | ·900 | ·932 | 71 | 59 | 66 | 13·90 | 6 |
| Akyab ... | 20·44 | ... | ... | ... | ... | ... | ... | ... | ... | Not received. | | | | | | | | | | | | | | | | | | | | | | | |
| Port Blair ... | 61·16 | ·781 | ·827 | ·736 | ·091 | 141·5 | 50·7 | 20th | 150·6 | 67·0 | 12·6 | 30th | 52·4 | 90·8 | 11·2 | 79·6 | 83·8 | 88·9 | 88·0 | 6th | 95·6 | 22·2 | 26th | 73·4 | ... | 1·006 | ·985 | ·971 | ... | 100 | 77 | 74 | 4·77 | 13 |
| Nancowry ... | 78 | ·786 | ·833 | ·739 | ·094 | 147·6 | 58·1 | 10th | 156·9 | 76·6 | 4·2 | 16, 21, 24, & 25th | 74·2 | 89·6 | 8·6 | 90·9 | 84·2 | 87·1 | 87·6 | 4 to 6th | 92·1 | 15·3 | 16th | 76·8 | ... | ·878 | ·903 | ·887 | ... | 83 | 71 | 69 | 9·60 | 12 |

CALCUTTA—MAY 1877.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mean barometric pressure of 24 years ... | ... | 29·656 | Mean temperature of 24 years ... | ... | 82·8 | Mean humidity of 24 years ... | ... 73 |
| Ditto ditto of 1877 ... | ... | ·724 | Ditto ditto of 1877 ... | ... | 86·1 | Ditto ditto of 1877 ... | ... 77 |
| Excess in 1877 ... ... | ... | ·068 | Defect in 1877 ... | ... | 3·3 | Excess in 1877 ... | ... 4 |

| | | |
|---|---|---|
| Mean rainfall of 49 years ... | ... | 5·39 |
| Actual fall of 1877 ... | ... | 5·06 |
| Defect in 1877 ... | ... | 0·33 |

CALCUTTA,
*The July* 1877.

JOHN ELIOT, M.A.,
*Meteorological Reporter to the Govt. of Bengal.*

*Mean Pressures and Temperatures of the preceding Table reduced to sea-level, with Anemometric Results and Cloud Observations.*

| Stations. | Mean barometric pressure reduced to sea-level. | Mean temperature reduced to sea-level. | Wind. | | | | | | | | | | | | Mean cloud. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | North. | North-east. | East. | South-east. | South. | South-west. | West. | North-west. | Calm. | Variable. | Percentage and Resultant. | Mean velocity daily. | |
| Seebsangor ... | 29·795 | 76·7 | 2 | 20 | ■ | 2 | 4 | 8 | 4 | 3 | 1 | ... | 37 N 72° E | 91·4 | 2·14 |
| Goalpara ... | ·756 | 78·1 | 2 | 6 | 21 | 9 | ... | 1 | 2 | 4 | 17 | ... | 42 N 80° E | 99·1 | 4·74 |
| Darjeeling ... | ..... | ... | 1 | ... | 1 | 3 | 9 | 21 | 18 | 9 | ... | ... | 65 S 63° W | ..... | 3·08 |
| Purneah ... | ·717 | 83·0 | 1 | 11 | 22 | 9 | 4 | 5 | 7 | 3 | ... | ... | 38 S 83° E | 104·1 | 3·16 |
| Durbhunga ... | ·693 | 83·7 | 3 | 6 | 20 | 0 | 1 | 4 | 6 | 3 | ... | ... | 47 S 88° E | 114·4 | 3·90 |
| Patna ... | ·690 | 87·7 | 1 | 5 | 33 | ... | ... | 1 | 18 | 2 | 2 | ... | 28 N 72° E | 61·5 | 4·81 |
| Gya ... | ·686 | 89·4 | 3 | 4 | 12 | 8 | 2 | 4 | 19 | 9 | 1 | .. | 13 N 78° W | 101·1 | 3·79 |
| Hazareebagh ... | ·723 | 88·0 | ... | ... | ... | 7 | 3 | 5 | 18 | 28 | 1 | ... | 60 N 77° W | 210·3 | 4·73 |
| Berhampore ... | ·712 | 84·8 | 3 | 6 | 7 | 3 | 9 | 23 | 6 | 5 | ... | ... | 88 S 37° W | ..... | 4·06 |
| Burdwan ... | ·731 | 85·7 | 1 | 1 | 2 | 7 | 20 | 9 | 17 | 2 | 3 | ... | 53 S 81° W | 109·8 | 3·59 |
| Jessore ... | ·729 | 82·5 | ... | 2 | ... | 12 | 29 | 15 | 2 | 1 | 1 | ... | 74 S 4° W | 108·1 | 4·06 |
| Dacca ... | ·764 | 81·6 | 1 | 3 | 5 | 12 | 29 | 9 | 1 | 1 | 1 | ... | 66 S 11° E | 139·1 | 4·98 |
| Silchar ... | ·791 | 79·8 | 1 | 5 | 10 | 1 | ... | 2 | 4 | 4 | 35 | ... | 13 N 49° E | 74·2 | 3·59 |
| Chittagong ... | ..... | ... | ... | 7 | 3 | 7 | 17 | 19 | 6 | 1 | 2 | ... | 49 S 14° W | 164·2 | 4·90 |
| Demagree ... | ..... | ... | 7 | ... | ... | 7 | 8 | 5 | 6 | 3 | 26 | ... | 16 S 42° W | ..... | 3·65 |
| Calcutta (Alipore) | ·748 | 82·8 | 1 | 6 | 7 | 14 | 72 | 15 | 4 | 5 | ... | ... | 68 S 2° E | 161·9 | 3·38 |
| Saugor Island | ·738 | 85·5 | 1 | 5 | 6 | 10 | 48 | 44 | 6 | 4 | ... | ... | 66 S 16° W | 309·3 | 4·70 |
| Cuttack ... | ·742 | 89·2 | 2 | 1 | 5 | 3 | 19 | 19 | 11 | 2 | ... | ... | 57 S 31° W | 115·0 | 4·40 |
| False Point ... | ·767 | 84·8 | 4 | 1 | 4 | 13 | 13 | 67 | 9 | 3 | ... | ... | 62 S 35° W | ..... | 3·65 |
| Vizagapatam ... | ·768 | 87·6 | ... | 1 | 4 | 14 | 37 | 28 | 19 | 21 | ... | ... | 52 S 37° W | 66·5 | 4·00 |
| Akyab ... | ..... | ... | ... | ... | Not received. | | | | | | | | | | |
| Port Blair ... | ·844 | 83·9 | 1 | 12 | 7 | 11 | 4 | 7 | 17 | 3 | ... | ... | 8 S 9° W | ..... | 3·19 |
| Nancowry ... | ·806 | 84·4 | 1 | 6 | 7 | 10 | 4 | 24 | 8 | 2 | ... | ... | 37 S 21° W | 198·0 | 5·32 |

## NOTE.

*Barometric Pressure.*—The pressures in column 2 of the above table for all stations below 500 feet are reduced from those given in column 3 of the table on the previous page, by adding the weight of a column of air of the temperatures given in column 17. For stations above 500 feet elevation the reduction is made by Captain Allan Cunningham's table,—"Prof. papers on Indian Engineering, No. CXIII." The temperatures at the sea-level are taken from column 3 of the above table.

*Temperature.*—The temperatures in column 3 are reduced from those in column 17 on the preceding page, by adding 1° Fahrenheit for every 450 feet.

*Wind Resultant.*—The resultant wind direction and its comparative predominance are calculated from the whole number of wind observations recorded during the month. The relative predominance in the direction of the resultant is given as a percentage of the whole number of observations. The direction is computed in the usual way by Lambert's formula.

*Cloud.*—This column gives the average proportion of clouded sky, a cloudless sky being indicated by *o*, and one completely overcast by 1 *o*.

The above being all comparable, afford the data for constructing a meteorological chart for the month which shall show the isobaric and isothermal lines and the resultant wind directions, which last may be represented by arrows of varying length, proportioned to the prevalence of the wind. To these may be added the rainfall from the previous tables.

John Eliot, M.A.,
*Meteorological Reporter to the Govt. of Bengal.*

Calcutta,
*The 20th July* 1877.

## Meteorological Telegraphic Report for the period 22nd to 28th July 1877.

| Stations. | Date. | Hour. | Barometer reduced to 32°. | Barometer reduced to sea-level. | Hygrometer. Dry. | Hygrometer. Wet. | Humidity Sat.=100. | Wind. Direction. | Wind. Velocity.* | Rain. | Clouds. | Weather initials. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Calcutta. | July 22nd | 10 | 29·647 | 29·665 | 85·8 | 81·5 | 84 | S W by S | 8·5 | ..... | ..... | o |
| | | 16 | 29·560 | 29·579 | 88·8 | 81·9 | 73 | S W by S | 5·3 | ..... | ..... | o |
| | 23rd | 10 | 29·622 | 29·640 | 85·3 | 80·9 | 81 | S W by S | 4·3 | ..... | ..... | o |
| | | 16 | 29·583 | 29·601 | 87·8 | 80·7 | 73 | S W by S | 4·7 | ..... | ..... | o |
| | 24th | 10 | 29·710 | 29·729 | 81·3 | 77·0 | 81 | S W by W | 6·5 | 0·05 | ..... | o |
| | | 16 | 29·632 | 29·651 | 83·8 | 78·7 | 79 | S | 3·5 | 0·05 | K, C K | |
| | 25th | 10 | 29·738 | 29·756 | 85·8 | 80·5 | 79 | N | 2·3 | ..... | K | |
| | | 16 | 29·660 | 29·678 | 88·8 | 81·2 | 71 | S | 4·0 | ..... | K | |
| | 26th | 10 | 29·732 | 29·750 | 85·8 | 80·0 | 77 | S | 3·5 | ..... | K | |
| | | 16 | 29·622 | 29·640 | 87·3 | 79·6 | 70 | S S E | 7·5 | 0·02 | ..... | r o, |
| | 27th | 10 | 29·675 | 29·694 | 80·8 | 78·2 | 89 | S | 6·0 | 0·18 | ..... | o, r |
| | | 16 | 29·577 | 29·596 | 83·8 | 80·9 | 87 | S | 4·8 | 0·15 | ..... | o |
| | 28th | 10 | 29·568 | 29·587 | 84·3 | 80·2 | 83 | S S W | 5·0 | ..... | K | |
| | | 16 | 29·486 | 29·504 | 89·8 | 82·7 | 73 | S | 6·0 | ..... | K | |
| Saugor Island. | July 22nd | 10 | 29·660 | 29·666 | 87 | 84 | 88 | S W | 18·5 | ..... | F K | b, m |
| | | [illegible] | 29·588 | 29·594 | 87 | 84 | 88 | S S W | 16·4 | ..... | F C | m, o |
| | 23rd | 10 | 29·649 | 29·655 | 86 | 82 | 84 | S W | 14·2 | ..... | P C | m, o |
| | | 16 | 29·602 | 29·608 | 87 | 83 | 84 | S W | 11·8 | ..... | P | o, m |
| | 24th | 10 | 29·702 | 29·708 | 85 | 83 | 91 | S S W | 6·2 | 0·20 | P | o, p, m |
| | | 16 | 29·617 | 29·623 | 87 | 80 | 72 | N | 7·4 | 1·20 | P C | b, v |
| | 25th | 10 | 29·756 | 29·762 | 86 | 81 | 80 | S S E | 3·5 | ..... | P | b, v |
| | | 16 | 29·689 | 29·695 | 87 | 81 | 76 | S | 9·9 | ..... | F K | b, v |
| | 26th | 10 | 29·739 | 29·745 | 87 | 80 | 72 | S | 9·2 | ..... | F K | b, v |
| | | 16 | 29·630 | 29·636 | 87 | 80 | 72 | S S E | 11·1 | ..... | F K | b, v |
| | 27th | 10 | 29·655 | 29·661 | 86 | 81 | 80 | S | 11·3 | ..... | P | b, v |
| | | 16 | 29·570 | 29·576 | 87 | 82 | 80 | S S E | 11·4 | ..... | F K | b, v |
| | 28th | 10 | 29·569 | 29·575 | 87 | 82 | 80 | S S W | 14·2 | ..... | F K | b, m |
| | | 16 | 29·638 | 29·644 | 86 | 81 | 80 | S | 11·2 | ..... | F K | o, v |
| Chittagong. | July 22nd | 10 | 29·634 | 29·727 | 79 | 77 | 91 | S S E | 7·7 | 3·40 | P K | d |
| | 23rd | 10 | 29·646 | 29·739 | 79 | 78 | 96 | S E | 7·0 | 0·70 | P K | r |
| | 24th | 10 | 29·671 | 29·764 | 81 | 78 | 78 | S E | 4·1 | ..... | P K | g |
| | 25th | 10 | 29·715 | 29·807 | 85 | 79 | 76 | S | 5·4 | ..... | C K | b, v |
| | 26th | 10 | 29·712 | 29·804 | 86 | 79 | 76 | W S W | 4·4 | ..... | K | b, v |
| | 27th | 10 | 29·680 | 29·772 | 86 | 80 | 76 | S S W | 7·7 | ..... | K, C | b, v |
| | 28th | 10 | 29·584 | 29·677 | 79 | 77 | 91 | S E | 10·2 | 1·00 | N | r |
| Akyab. | July 22nd | 10 | 29·745 | 29·767 | 78 | 77 | 95 | E | 3·7 | 2·60 | N | |
| | 23rd | 10 | | | | | | | | | | |
| | 24th | 10 | 29·745 | 29·767 | 81 | 77 | 83 | E | 3·3 | 1·30 | N, C K | |
| | 25th | 10 | 29·779 | 29·801 | 83 | 79 | 83 | E | 1·7 | | C K, N | |
| | 26th | 10 | 29·779 | 29·801 | 82 | 79 | 87 | E | 3·3 | 0·10 | C K, N | |
| | 27th | 10 | 29·766 | 29·788 | 84 | 81 | 87 | S E | 2·6 | 0·90 | C K, N | |
| | 28st | 10 | 29·097 | 29·719 | 81 | 80 | 90 | S | 3·4 | 1·90 | C K, N | |
| Cuttack. | July 22nd | 10 | 29·616 | 29·697 | 92 | 80 | 57 | W S W | 3·7 | ..... | C | o |
| | 23rd | 10 | 29·611 | 29·693 | 91 | 79 | 57 | W | 3·2 | ..... | C | o |
| | 24th | 10 | 29·618 | 29·699 | 91 | 80 | 60 | W | 2·0 | ..... | C C K | o |
| | 25th | 10 | 29·606 | 29·780 | 86 | 78 | 68 | W S W | 1·8 | 0·30 | C K P K | o |
| | 26th | 10 | 29·656 | 29·738 | 86 | 78 | 69 | E S E | 3·2 | ..... | C P K | o |
| | 27th | 10 | 29·576 | 29·658 | 86 | 78 | 68 | W | 1·6 | ..... | C K P K C | |
| | 28th | 10 | 29·485 | 29·566 | 88 | 81 | 73 | W N W | 2·0 | 0·40 | P K C | |
| Vizagapatam. | July 22nd | 10 | 29·744 | 29·775 | 90 | 78 | 56 | N W | 2·5 | ..... | C | |
| | 23rd | 10 | 29·697 | 29·728 | 89 | 80 | 66 | N W | 2·1 | 0·70 | ..... | r |
| | 24th | 10 | 29·712 | 29·743 | 87 | 78 | 65 | N by W | 0·4 | ..... | ..... | o |
| | 25th | 10 | 29·777 | 29·808 | 86 | 79 | 76 | S E by E | 0·4 | ..... | ..... | d |
| | 26th | 10 | 29·708 | 29·739 | 85 | 79 | 78 | N W | 0·6 | ..... | ..... | o |
| | 27th | 10 | 29·628 | 29·659 | 85 | 79 | 78 | N W | 0·3 | 0·90 | C | |
| | 28th | 10 | 29·608 | 29·639 | 85 | 79 | 76 | W N W | 4·0 | 0·40 | C | |
| Madras. | July 21st | 10 | 29·835 | 29·857 | 95 | 77 | 42 | W N W | 8 | | ..... | o |
| | | 16 | 29·753 | 29·775 | 99 | 77 | 56 | S E | 10 | | ..... | bc |
| | 22nd | 10 | 29·847 | 29·869 | 90 | 76 | 50 | W by S | 9 | 0·01 | ..... | cloudy |
| | | 16 | 29·742 | 29·764 | 86 | 76 | 61 | S S E | 8 | | ..... | o |
| | 23rd | 10 | 29·821 | 29·843 | 94 | 76 | 38 | W by S | 11 | | ..... | c |
| | | 16 | 29·710 | 29·732 | 87 | 77 | 62 | E by N | 4 | | ..... | cloudy |
| | 24th | 10 | 29·819 | 29·841 | 93 | 74 | 38 | W | 12 | | ..... | o |
| | | 16 | 29·707 | 29·729 | 90 | 75 | 47 | S E | 11 | | ..... | o |
| | 25th | 10 | 29·853 | 29·875 | 90 | 75 | 47 | W S W | 11 | | ..... | o |
| | | 16 | 29·749 | 29·771 | 89 | 77 | 56 | E S E | 9 | | ..... | o |
| | 26th | 10 | 29·834 | 29·856 | 85 | 77 | 68 | W S W | 8 | 0·46 | ..... | o |
| | | 16 | 29·693 | 29·715 | 89 | 78 | 59 | E by N | 8 | | ..... | cloudy |
| | 27th | 10 | 29·807 | 29·829 | 87 | 77 | 62 | S W by W | 8 | 0·81 | ..... | cloudy |
| | | 16 | 29·699 | 29·721 | 89 | 77 | 56 | S E by S | 9 | | ..... | o |
| Colombo. | July 25th | 16 | 29·874 | 29·915 | 83 | 78 | 79 | S W | 6·2 | ..... | C | c |
| | 26th | 10 | 29·927 | 29·968 | 83 | 78 | 79 | S W | 9·4 | ..... | C | |
| | 27th | 10 | 29·892 | 29·933 | 80 | 77 | 87 | S W | 6·2 | ..... | ..... | |
| | 28th | 10 | 29·879 | 29·920 | 83 | 79 | 83 | S W | 4·9 | 0·10 | C | |

* Velocity of wind in miles per hour.

CALCUTTA,
*The 28th July* 1877.

JOHN ELIOT, M.A.,
*Meteorological Reporter to the Government of Bengal.*

## Results of the Meteorological Observations taken at the Alipore Observatory from 22nd to 28th July 1877.

| Month. | Date. | Maximum in sun. | Mean pressure; barometer at 32° Fah. | Temperature. Mean. | Maximum. | Range. | Minimum. | Hygrometry. Mean wet bulb. | Vapour tension. | Dew point. | Humidity. | Wind. Prevailing direction. | Miles recorded. | Rain. | Weather. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1877. | | ⊖ | Inches. | ⊖ | ⊖ | ⊖ | ⊖ | ⊖ | Inch. | ⊖ | % | | | Inch. | |
| July | 22nd | 144·8 | 29·615 | 84·1 | 90·3 | 10·7 | 79·6 | 82·2 | 1·074 | 81·4 | 91 | Chiefly S. S. W. | 176 | Nil | Cloudy, & *o*. |
| " | 23rd | 144·2 | ·614 | 83·7 | 89·9 | 9·9 | 80·0 | 80·7 | 1·009 | 79·5 | 87 | Chiefly S. S. W. | 101 | Nil | Cloudy, *d* at 8-55 P.M., & *o*. |
| " | 24th | 130·9 | ·681 | 80·2 | 84·0 | 6·0 | 78·0 | 76·2 | 0·851 | 74·4 | 82 | Till 5 P.M. veered to N.E. through W. and N. till midnight, S.E. through E. | 102 | 0·15* | Cloudy, till 6½ P.M. *o*, & *g*. night Clear ☽ at 8 P.M. |
| " | 25th | 155·8 | ·720 | 82·1 | 89·8 | 13·4 | 76·4 | 78·8 | ·943 | 77·4 | 86 | Till 11 A.M. N. through E. till midnight veered to S. through W. | 72 | Nil | Partially cloudy. |
| " | 26th | 153·8 | ·693 | 82·4 | 89·7 | 12·8 | 76·9 | 78·3 | ·916 | 76·6 | 83 | South till noon, till midnight S.E. by S. | 111 | 0·05† | Partially cloudy. |
| " | 27th | 151·2 | ·629 | 80·0 | 87·0 | 8·1 | 78·9 | 76·8 | ·973 | 78·4 | 96 | Chiefly S.E. by S. and S. | 96 | 0·52 | Partially cloudy, rain at 9-47 A.M, and at 1-30 P.M., *d* at 11-55 A.M., *o* & *g*. |
| " | 28th | 159·5 | ·536 | 82·8 | 89·6 | 11·6 | 79·0 | 79·7 | ·975 | 78·5 | 87 | Chiefly S. by W. and S. | 115 | Nil | Chiefly cloudy, *lr* at 9-5 P.M., & *o*. |

* Fell at 5-20 A. M.

† Fell at 3-8 A. M.

| | | Inch. |
|---|---|---|
| The mean pressure of the seven days | ... ... ... | 29·641 |
| The average pressure of the corresponding period for 20 years | ... ... | 29·534 |
| | | ⊖ |
| The mean temperature of the seven days | ... ... ... | 82·2 |
| The average temperature of the corresponding period for 20 years | ... | 83·1 |
| The extreme variation of temperature during the seven days | ... ... | 13·9 |
| The maximum temperature during the seven days | ... ... | 90·3 |
| The mean humidity during the seven days | ... ... ... | 87% |
| The average humidity of the corresponding period for 24 years | ... ... | 87 |
| | | Inch. |
| The total fall of rain from 22nd to 28th July | ... ... | 0·72 |
| The average fall of the corresponding period for 24 years | ... ... | 3·45 |
| The total fall from 1st January to 28th July | ... ... | 31·24 |
| The average fall of the corresponding period for 24 years | ... ... | 33·19 |

The mean pressure, temperature, &c., are deduced from observations made at 6h., 10h., 16h., and 22h.; the maximum and minimum temperatures from self-registering thermometers. All the thermometers are verified, and the readings have been corrected to a standard constructed and verified at the Kew Observatory. They are exposed under a thatched shed open at the sides, and are suspended four feet above the ground.

The barometer readings are corrected approximately to those of the standard (Newman's No. 86) at the Surveyor-General's Office.

The hygrometric elements are obtained from tables III, IV, and V of the official tables computed in the Meteorological Office, and based on Regnault's modification of August's formula.

The direction and movement of the wind are taken from the trace of Beckley's anemograph.

The mouth of the rain-gauge is one foot above the ground.

*o* Overcast, *d* drizzling, *lr* lightning, reflection, ☽ lunar corona, *g* gloomy.

JOHN ELIOT, *Meteorological Reporter to the Government of Bengal, for Meteorological Reporter to the Government of India.*

METEOROLOGICAL OFFICE, INDIA, the 30th July 1877.

# PUBLIC WORKS DEPARTMENT, IRRIGATION BRANCH, BENGAL.

*Statements showing the total amount of Traffic and Tolls on the Canals for the month of May 1877.*

## ORISSA CIRCLE.

### *Kendrapara Canal.*

LENGTH OF CANAL OPEN—39 MILES.

| Number of boats. | Nature of cargo. | APPROXIMATE | | TONNAGE OF BOATS. | | Ton mileage. | Tollage. | Rate of toll per ton mile. |
|---|---|---|---|---|---|---|---|---|
| | | Weight of cargo. | Value of cargo. | Mds. | Tons. | | | |
| | **LOCAL TRAFFIC.** | | | | | | | |
| | **(1) PRIVATE.** | | | | | | | |
| | | Mds. | Rs. | | | | Rs. A. P. | A. P. |
| 3 | Rice ... ... ... ... ... ... | 650 | 1,300 | 1,097 | 36 | 324 | 9 12 0 | ..... |
| 6 | Empty boats ... ... ... ... ... | ..... | ..... | 569 | 20 | 200 | 3 11 3 | ..... |
| 9 | Total ... | 650 | 1,300 | 1,576 | 56 | 524 | 13 7 3 | 0 4·9 |
| 82 | Total of same month last year ... | 6,729 | 47,496 | 12,383 | 443 | 8,072 | 84 6 8 | 0 1·6 |
| | MISCELLANEOUS. | | | | | | | |
| | Demurrage of boats ... ... ... ... | ..... | ..... | ..... | ..... | ..... | 12 6 0 | ..... |
| ... | Total ... | ..... | ..... | ..... | ..... | ..... | 12 6 0 | ..... |
| 1 | Total of same month last year ... | ..... | 1 | ..... | ..... | ..... | 0 1 6 | ..... |
| | **(2) STORES AND MATERIALS FOR IRRIGATION WORKS.** | | | | | | | |
| ... | Nil | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| ... | Total ... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 8 | Total of same month last year ... | 100 | 25 | 630 | 22 | 352 | 6 4 0 | 0 3·4 |
| | MISCELLANEOUS. | | | | | | | |
| 1 | Bamboos, 300 in number... ... ... ... | ..... | 6 | ..... | ..... | ..... | 0 6 8 | ..... |
| 1 | Total ... | ..... | 6 | ..... | ..... | ..... | 0 6 8 | ..... |
| ... | Total of same month last year ... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | **TRAFFIC BETWEEN CUTTACK AND SEABOARD.** | | | | | | | |
| | **(1) PRIVATE.** | | | | | | | |
| 1 | Piece-goods, &c. ... ... ... ... ... | 420 | 15,000 | 420 | ..... | ..... | 9 2 8 | ..... |
| 1 | Betel-nuts and spices ... ... ... ... | 392 | 10,535 | 392 | ..... | ..... | 8 8 6 | ..... |
| 1 | Beer oilman's stores, &c.... ... ... | 250 | 4,300 | 250 | ..... | ..... | 6 1 6 | ..... |
| 1 | Passenger boat ... ... ... ... ... | ..... | ..... | 50 | ..... | ..... | 0 12 10 | ..... |
| 7 | Empty boats ... ... ... ... ... | ..... | ..... | 706 | ..... | ..... | 10 8 0 | ..... |
| 11 | Total ... | 1,062 | 29,835 | 1,868 | 69 | 2,700 | 35 1 1 | 0 2·4 |
| 94 | Total of same month last year ... | 12,340 | 48,400 | 24,299 | 868 | 34,720 | 332 15 4 | 0 1·8 |
| | MISCELLANEOUS. | | | | | | | |
| ... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| ... | Total ... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1 | Total of same month last year ... | ..... | 48 | ..... | ..... | ..... | 3 0 0 | ..... |
| | **(2) STORES AND MATERIALS FOR IRRIGATION WORKS.** | | | | | | | |
| ... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| ... | Total ... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 4 | Total of same month last year ... | 1,200 | 333 | 2,760 | 99 | 3,960 | 33 0 0 | 0 1·5 |
| | MISCELLANEOUS. | | | | | | | |
| 8 | Boats passed free ... ... ... ... ... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 8 | Total ... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| ... | Total of same month last year ... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

## *Kendrapara Canal.*—(Continued)

| Number of boats. | Nature of cargo. | Approximate Weight of cargo. | Approximate Value of cargo. | Tonnage of Boats. Mds. | Tonnage of Boats. Tons. | Ton mileage. | Tollage. | Rate of toll per ton mile. |
|---|---|---|---|---|---|---|---|---|
| | **ABSTRACT—LOCAL TRAFFIC.** | | | | | | | |
| | | Mds. | Rs. | | | | Rs. A. P | A. P. |
| 9 | Private, including miscellaneous ... ... | 650 | 1,300 | 1,576 | 56 | 524 | 25 13 8 | ..... |
| 1 | Government stores, including miscellaneous | ..... | 6 | ..... | ..... | ..... | 0 6 8 | ..... |
| 10 | Total ... | 650 | 1,306 | 1,576 | 56 | 524 | 26 3 11 | ..... |
| 86 | Total of same month last year ... | 6,839 | 47,512 | 13,019 | 465 | 9,024 | 90 12 0 | ..... |
| | **TRAFFIC BETWEEN CUTTACK AND SEABOARD.** | | | | | | | |
| 11 | Private, including miscellaneous ... ... | 1,092 | 29,835 | 1,938 | 69 | 2,760 | 35 1 1 | ..... |
| 8 | Government stores, including miscellaneous | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 19 | Total ... | 1,092 | 29,835 | 1,038 | 69 | 2,760 | 35 1 1 | ..... |
| 99 | Total of same month last year ... | 13,640 | 49,281 | 27,059 | 967 | 38,680 | 367 15 4 | ..... |
| 29 | Grand Total ... | 1,742 | 31,141 | 3,514 | 125 | 3,284 | 61 5 0 | ..... |
| 185 | Grant Total of same month last year ... | 20,469 | 96,803 | 40,078 | 1,432 | 47,704 | 458 11 4 | ..... |

The Kendrapara Canal was closed for annual repairs from 5th May 1877.

## *High Level Canal.*

### LENGTH OF CANAL OPEN—87 MILES.

#### LOCAL TRAFFIC.

(1) PRIVATE.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ... | ..... ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| ... | Total ... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 110 | Total of same month last year ... | 6,023 | 26,418 | 17,665 | 639 | 9,867 | 181 7 1 | 0 2·5 |

(2) STORES AND MATERIALS FOR IRRIGATION WORKS.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ... | ..... ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| ... | Total ... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 13 | Total of same month last year ... | 1,077 | 1,013 | 4,110 | 147 | 3,435 | 42 2 0 | 0 2·5 |
| ... | MISCELLANEOUS. | | | | | | | ..... |
| ... | Total ... | ..... | ..... | ..... | ..... | ..... | ..... | |
| 8 | Total of same month last year ... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | **ABSTRACT.** | | | | | | | |
| ... | Private, including miscellaneous ... ... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| ... | Government stores, including miscellaneous | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| ... | Grand Total ... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 131 | Grand total of same month last year ... | 7,100 | 26,430 | 21,775 | 776 | 13,323 | 178 9 1 | ..... |

The High Level Canal was closed for annual repairs during May 1877.

## *Taldunda Canal.*

### LENGTH OF CANAL OPEN—27 MILES.

#### LOCAL TRAFFIC.

(1) PRIVATE.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 6 | Paddy ... ... ... ... ... ... | 1,740 | 1,428 | 2,728 | 97 | 1,170 | 6 13 2 | ..... |
| 1 | Rice ... ... ... ... ... ... | 180 | 360 | 680 | 25 | 638 | 1 10 0 | ..... |
| 1 | Jaggery ... ... ... ... ... ... | 502 | 1,450 | 490 | 18 | 497 | 1 3 7 | ..... |
| 4 | Mangoes ... ... ... ... ... ... | 218 | 75 | 373 | 13 | 20 | 0 9 3 | ..... |
| 1 | Preserved mangoes ... ... ... ... | 102 | 486 | 297 | 11 | 158 | 0 11 11 | ..... |
| 4 | Clothes ... ... ... ... ... ... | 1,484 | 5,650 | 2,682 | 96 | 2,585 | 6 11 4 | ..... |
| 13 | Rubble ... ... ... ... ... ... | 5,471 | 242 | 10,476 | 374 | 955 | 14 13 3 | ..... |
| 2 | Lime ... ... ... ... ... ... | 640 | 150 | 1,200 | 43 | 55 | 0 13 0 | ..... |
| 1 | Straw ... ... ... ... ... ... | 205 | 50 | 375 | 13 | 135 | 0 13 0 | ..... |
| 2 | Bamboos ... ... ... ... ... ... | 405 | 50 | 758 | 27 | 270 | 1 14 2 | ..... |
| 1 | Cart wheels ... ... ... ... ... | 10 | 75 | 285 | 10 | 277 | 0 11 6 | ..... |
| 3 | Passenger boats ... ... ... ... | ..... | ..... | 305 | 11 | 155 | 0 12 2 | ..... |
| 59 | Empty boats ... ... ... ... ... | ..... | ..... | 11,880 | 424 | 5,315 | 23 7 5 | ..... |
| 98 | Total ... | 11,776 | 9,923 | 32,494 | 1,160 | 12,391 | 61 0 9 | 0 ·9 |
| 35 | Total of same month last year ... | 1,450 | 1,000 | 6,998 | 250 | 2,755 | 25 4 4 | 0 1·7 |
| | MISCELLANEOUS. | | | | | | | |
| ... | 62 logs ... ... ... ... ... ... | ..... | 155 | ..... | ..... | ..... | 11 4 0 | ..... |
| ... | 8,900 bamboos ... ... ... ... ... | ..... | 170 | ..... | ..... | ..... | 12 0 0 | ..... |
| ... | 16 passengers for 16 miles ... ... | ..... | ..... | ..... | ..... | ..... | 0 5 4 | ..... |
| ... | Demurrage of three boats for thirteen days... | ..... | ..... | ..... | ..... | ..... | 1 5 2 | ..... |
| ... | Total ... | ..... | 325 | ..... | ..... | ..... | 24 14 6 | ..... |
| ... | Total of same month last year ... | ..... | 210 | ..... | ..... | ..... | 21 2 0 | ..... |

*Taldunda Canal.*—(Continued.)

| Number of boats. | Nature of cargo. | Approximate Weight of cargo. | Approximate Value of cargo. | Tonnage of Boats. Mds. | Tons. | Ton mileage. | Tollage. | Rate of toll per ton mile. |
|---|---|---|---|---|---|---|---|---|
| | (2) STORES AND MATERIALS FOR IRRIGATION WORKS. | | | | | | | |
| | | Mds. | Rs. | | | | Rs. A. P. | A. P. |
| 114 | Rubble ... ... ... ... ... ... | 43,066 | 1,760 | 77,420 | 2,765 | 16,590 | 193 9 0 | ... .. |
| 113 | Empty boats ... ... ... ... ... | ..... | ..... | 33,482 | 1,196 | 7,176 | 83 11 6 | ..... |
| 227 | Total ... | 43,066 | 1,760 | 110,902 | 3,961 | 23,766 | 277 4 6 | 0 2·2 |
| 270 | Total of same month last year ... | 46,225 | 1,644 | 123,835 | 4,423 | 8,869 | 308 4 10 | 0 6·7 |
| | MISCELLANEOUS. | | | | | | | |
| ... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| ... | Total ... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| ... | Total of same month last year ... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | ABSTRACT—LOCAL TRAFFIC. | | | | | | | |
| 98 | Private, including miscellaneous ... ... | 11,776 | 10,248 | 32,496 | 1,160 | 12,381 | 85 15 3 | ..... |
| 227 | Government stores, including miscellaneous | 43,666 | 1,760 | 110,902 | 3,961 | 23,766 | 277 4 6 | ..... |
| 325 | Grand Total ... | 55,442 | 12,008 | 143,398 | 5,121 | 36,147 | 363 3 9 | ..... |
| 305 | Grand total of same month last year ... | 47,084 | 2,554 | 130,333 | 4,655 | 11,544 | 355 11 2 | ..... |

## SOUTH-WESTERN CIRCLE.

*Midnapore Canal.*

LENGTH OF CANAL OPEN—53 MILES.

LOCAL TRAFFIC.

(1) PRIVATE.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2 | Betel-nuts ... ... ... ... ... ... | 95 | 665 | 225 | ..... | ..... | 4 0 6 | ..... |
| 2 | Betel-leaves ... ... ... ... ... ... | 60 | 180 | 150 | ..... | ..... | 1 0 0 | ..... |
| 3 | Coal and coke ... ... ... ... ... | 625 | 208 | 1,150 | ..... | ..... | 7 0 6 | ..... |
| 4 | Cotton, raw ... ... ... ... ... | 355 | 9,625 | 1,050 | ..... | ..... | 7 2 6 | ..... |
| 6 | Cotton piece-goods (European) ... ... | 762 | 40,800 | 4,640 | ..... | ..... | 29 0 9 | ..... |
| 3 | Castor-seed ... ... ... ... ... | 180 | 540 | 350 | ..... | ..... | 5 4 0 | ..... |
| 1 | Cocoanuts, No. 1300 ... ... ... ... | 100 | 100 | 225 | ..... | ..... | 4 12 6 | ..... |
| 490 | Empty boats ... ... ... ... ... | ..... | ..... | 35,475 | ..... | ..... | 647 6 3 | ..... |
| 1 | Earthenware ... ... ... ... ... | 20 | 5 | 100 | ..... | ..... | 0 5 0 | ..... |
| 2 | Firewood ... ... ... ... ... ... | 160 | 85 | 450 | ..... | ..... | 2 4 0 | ..... |
| 25 | Fruits and nuts of all kinds ... ... ... | 6,050 | 11,555 | 10,805 | ..... | ..... | 90 12 3 | ..... |
| 28 | Grain and pulse ... ... ... ... ... | 4,185 | 8,365 | 9,240 | ..... | ..... | 97 3 0 | ..... |
| 2 | Gunny bags, No. 2300 ... ... ... ... | 825 | 560 | 825 | ..... | ..... | 5 2 6 | ..... |
| 2 | Hides of cattle, untanned, No. 1800 ... | 320 | 3,800 | 475 | ..... | ..... | 2 15 6 | ..... |
| 3 | Iron and its manufacture ... ... ... | 550 | 2,780 | 1,150 | ..... | ..... | 9 13 0 | ..... |
| 2 | Indigo seed ... ... ... ... ... ... | 630 | 13,400 | 1,200 | ..... | ..... | 25 8 6 | ..... |
| 2 | Liquor ... ... ... ... ... ... | 15 | 250 | 120 | ..... | ..... | 1 13 0 | ..... |
| 21 | Linseed ... ... ... ... ... ... | 2,100 | 21,650 | 14,075 | ..... | ..... | 137 8 6 | ..... |
| 1 | Other fibres, raw ... ... ... ... ... | 150 | 150 | 400 | ..... | ..... | 3 3 0 | ..... |
| 2 | Other fibres, manufactured ... ... ... | 20 | 245 | 275 | ..... | ..... | 5 1 9 | ..... |
| 261 | Paddy ... ... ... ... ... ... | 23,907 | 24,148 | 58,030 | ..... | ..... | 379 4 9 | ..... |
| 247 | Passenger boats ... ... ... ... ... | ..... | ..... | 11,455 | ..... | ..... | 164 9 0 | ..... |
| 154 | Rice ... ... ... ... ... ... | 43,530 | 72,429 | 76,775 | ..... | ..... | 820 0 6 | ..... |
| 4 | Sugar, unrefined ... ... ... ... ... | 700 | 2,800 | 1,400 | ..... | ..... | 12 12 0 | ..... |
| 62 | Salt ... ... ... ... ... ... | 21,465 | 25,048 | 41,475 | ..... | ..... | 373 11 6 | ..... |
| 1 | Straw ... ... ... ... ... ... | 32 | 8 | 100 | ..... | ..... | 0 3 0 | ..... |
| 3 | Spices ... ... ... ... ... ... | 400 | 5,300 | 925 | ..... | ..... | 7 15 6 | ..... |
| 5 | Sál piles ... ... ... ... ... ... | 175 | 275 | 275 | ..... | ..... | 0 5 6 | ..... |
| 4 | Stone plates ... ... ... ... ... | 780 | 3,250 | 1,175 | ..... | ..... | 10 11 6 | ..... |
| 13 | Timber ... ... ... ... ... ... | 985 | 1,380 | 985 | ..... | ..... | 29 8 0 | ..... |
| 26 | Tobacco ... ... ... ... ... ... | 4,015 | 28,100 | 6,525 | ..... | ..... | 81 13 6 | ..... |
| 5 | Vegetable and other kinds of provisions ... | 305 | 532 | 1,000 | ..... | ..... | 10 12 6 | ..... |
| 4 | Wheat ... ... ... ... ... ... | 625 | 1,890 | 1,250 | ..... | ..... | 13 4 6 | ..... |
| 1,339 | Total ... | 1,19,728 | 3,48,490 | 2,66,420 | 9,515 | 1,90,378 | 3,274 1 9 | 0 3·3 |
| 2,973 | Total of same month last year ... | 2,02,573 | 14,60,759 | 5,98,905 | 21,210 | 3,29,268 | 4,883 1 9 | 0 3 |
| | MISCELLANEOUS. | | | | | | | |
| ... | Passengers, No. 1262 ... ... ... ... | ..... | ..... | ..... | ..... | ..... | 84 12 3 | ..... |
| ... | Rafts of timber, No. 16 ... ... ... ... | ..... | 351 | ..... | ..... | ..... | 3 0 6 | ..... |
| 1 | Sál piles, No. 53 ... ... ... ... ... | ..... | 160 | ..... | ..... | ..... | 1 1 0 | ..... |
| | Demurrage, &c., &c. ... ... ... ... | ..... | ..... | ..... | ..... | ..... | 1 0 0 | ..... |
| 6 | Boats passed free ... ... ... ... ... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 7 | Total ... | ..... | 511 | ..... | ..... | ..... | 89 13 9 | ..... |
| 18 | Total of same month last year ... | ..... | 1,340 | ..... | ..... | ..... | 269 13 6 | ..... |
| | ABSTRACT—LOCAL TRAFFIC. | | | | | | | |
| 1,326 | Private, including miscellaneous ... ... | 1,19,728 | 3,49,001 | 2,66,420 | 9,515 | 1,90,378 | 3,313 15 6 | ..... |
| ... | Government stores, ditto ... ... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1,326 | Grand Total ... | 1,19,728 | 3,49,001 | 2,66,420 | 9,515 | 1,90,378 | 3,313 15 6 | ..... |
| 2,991 | Grand total of same month last year ... | 2,02,573 | 14,62,099 | 5,03,905 | 21,210 | 3,29,268 | 5,152 15 3 | ..... |

REMARKS.—A ton of goods was carried on the average 20 miles during the month, whereas in May 1876 it was 16 miles. The Canal Range I was closed during the month for repairs.

## *Hidgellee Tidal Canal.*

### LENGTH OF CANAL OPEN—29 MILES.

| Number of boats. | Nature of cargo. | APPROXIMATE | | TONNAGE OF BOATS. | | Ton mileage. | Tollage. | Rate of toll per ton mile. |
|---|---|---|---|---|---|---|---|---|
| | | Weight of cargo. | Value of cargo. | Mds. | Tons. | | | |
| | **LOCAL TRAFFIC.** | | | | | | | |
| | **(1) PRIVATE.** | | | | | | | |
| | | Mds. | Rs. | | | | Rs. A. P. | A. P. |
| 682 | Paddy ... ... ... ... ... ... | 1,31,832 | 1,14,811 | 2,62,300 | ..... | ..... | 4,134 2 3 | ..... |
| 436 | Rice ... ... ... ... ... ... | 47,036 | 83,957 | 95,530 | ..... | ..... | 1,070 4 3 | ..... |
| 4 | Fuel ... ... ... ... ... ... | 256 | 105 | 480 | ..... | ..... | 3 13 9 | ..... |
| 2 | Lime ... ... ... ... ... ... | 280 | 222 | 675 | ..... | ..... | 11 3 3 | ..... |
| 172 | Miscellaneous ... ... ... ... ... | 6,018 | 44,827 | 31,640 | ..... | ..... | 477 1 3 | ..... |
| 5 | Sugar, unrefined ... ... ... ... ... | 313 | 935 | 1,225 | ..... | ..... | 14 15 9 | ..... |
| 5 | Betel-nuts ... ... ... ... ... | 279 | 1,630 | 895 | ..... | ..... | 14 0 6 | ..... |
| 40 | Salt ... ... ... ... ... ... | 9,032 | 356,020 | 22,150 | ..... | ..... | 319 11 6 | ..... |
| 12 | Tobacco ... ... ... ... ... ... | 441 | 2,085 | 2,650 | ..... | ..... | 31 8 3 | ..... |
| 25 | Tamarind ... ... ... ... ... | 405 | 489 | 2,750 | ..... | ..... | 40 0 9 | ..... |
| 10 | Coal ... ... ... ... ... ... | 1,025 | 338 | 3,610 | ..... | ..... | 44 11 6 | ..... |
| 1 | Furnitures ... ... ... ... ... ... | 50 | 500 | 275 | ..... | ..... | 1 14 3 | ..... |
| 9 | Cotton ... ... ... ... ... ... | 852 | 3,132 | 3,200 | ..... | ..... | 48 7 0 | ..... |
| 1 | Sand ... ... ... ... ... ... | 250 | 4 | 125 | ..... | ..... | 0 13 9 | ..... |
| 1 | Wine ... ... ... ... ... ... | 4 | 158 | 125 | ..... | ..... | 2 4 3 | ..... |
| 2 | Soorkee ... ... ... ... ... ... | 450 | 136 | 1,280 | ..... | ..... | 22 10 6 | ..... |
| 1 | Hemp ... ... ... ... ... ... | 100 | 400 | 450 | ..... | ..... | 3 1 6 | ..... |
| 15 | Passenger boats ... ... ... ... ... | ..... | ..... | 1,620 | ..... | ..... | 18 0 6 | ..... |
| 1,077 | Empty boats ... ... ... ... ... | ..... | ..... | 1,00,285 | ..... | ..... | 1,314 8 0 | ..... |
| 2,482 | Total ... | 1,98,324 | 6,09,349 | 5,21,035 | 18,609 | 4,27,984 | 7,573 4 9 | 0 3·3 |
| 1,338 | Total of same month last year ... | 1,21,245 | 1,58,104 | 3,39,975 | 12,142 | 2,73,129 | 4,771 8 9 | 0 3·3 |
| | **MISCELLANEOUS.** | | | | | | | |
| 4 | Earthenware, No. 1500 ... ... ... ... | ..... | 15 | ..... | ..... | ..... | 3 1 3 | ..... |
| 30 | Straw (278 kahuns) ... ... ... ... | ..... | 451 | ..... | ..... | ..... | 69 13 6 | ..... |
| 5 | Mats, No. 3125 ... ... ... ... ... | ..... | 1,350 | ..... | ..... | ..... | 11 1 0 | ..... |
| 8 | Bamboos, No. 415 ... ... ... ... | ..... | 45 | ..... | ..... | ..... | 16 5 0 | ..... |
| 3 | Cotton piece-goods ... ... ... ... | ..... | 2,050 | ..... | ..... | ..... | 9 15 6 | ..... |
| 2 | Cocoanuts (No. 1100) ... ... ... ... | ..... | 88 | ..... | ..... | ..... | 0 0 0 | ..... |
| 1 | Skin (No. 500) ... ... ... ... ... | ..... | 600 | ..... | ..... | ..... | 1 3 3 | ..... |
| 1 | Timber, No. 14 ... ... ... ... ... | ..... | 300 | ..... | ..... | ..... | 1 14 3 | ..... |
| 1 | Watermelons, No. 500 ... ... ... ... | ..... | 15 | ..... | ..... | ..... | 1 13 0 | ..... |
| 1 | Bricks, No. 2500 ... ... ... ... | ..... | 25 | ..... | ..... | ..... | 2 9 3 | ..... |
| 1 | Ganges water ... ... ... ... ... | ..... | ..... | ..... | ..... | ..... | 2 6 6 | ..... |
| ... | Passengers, No. 95 ... ... ... ... | ..... | ..... | ..... | ..... | ..... | 2 6 9 | ..... |
| ... | Demurrage ... ... ... ... ... | ..... | ..... | ..... | ..... | ..... | 16 5 6 | ..... |
| 64 | Total ... | ..... | 4,884 | ..... | ..... | ..... | 144 14 9 | ..... |
| 8 | Total of same month last year ... | ..... | 222 | ..... | ..... | ..... | 23 7 6 | ..... |

### ABSTRACT—LOCAL TRAFFIC.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 2,546 | Private, including miscellaneous ... ... | 1,98,224 | 6,14,433 | 5,21,035 | 18,609 | 4,27,984 | 7,718 3 6 | ..... |
| ... | Government stores, including miscellaneous | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 2,546 | Grand Total ... | 1,98,224 | 6,14,433 | 5,21,035 | 18,609 | 4,27,984 | 7,718 3 6 | ..... |
| 1,341 | Grand total of same month last year ... | 1,21,245 | 1,58,326 | 3,39,975 | 12,142 | 2,73,129 | 4,794 0 1 | ..... |

## SONE CIRCLE.

## *Arrah Canal.*

### LENGTH OF CANAL OPEN—56 MILES.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **LOCAL TRAFFIC.** | | | | | | | |
| | **(1) PRIVATE.** | | | | | | | |
| 8 | Goor ... ... ... ... ... ... | 774 | 2,128 | 2,019 | 74 | 5,967 | 32 15 6 | ..... |
| 4 | Wheat ... ... ... ... ... ... | 1,341 | 3,650 | 2,173 | 80 | 5,195 | 33 8 3 | ..... |
| 8 | Salt ... ... ... ... ... ... | 1,664 | 8,520 | 2,197 | 61 | 3,380 | 36 15 3 | ..... |
| 1 | Box of cloth ... ... ... ... ... | 80 | 1,840 | 175 | 6 | 257 | 2 11 9 | ..... |
| 6 | Firewood ... ... ... ... ... | 1,250 | 125 | 2,474 | 91 | 1,818 | 17 0 9 | ..... |
| 5 | Passenger boats ... ... ... ... ... | ..... | ..... | 245 | 9 | 241 | 2 3 3 | ..... |
| 5 | Empty boats ... ... ... ... ... | ..... | ..... | 779 | 29 | 1,087 | 6 6 6 | ..... |
| 37 | Total ... | 5,118 | 16,263 | 10,060 | 370 | 12,953 | 131 3 3 | 0 1·0 |
| ... | Total of same month last year ... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | **MISCELLANEOUS.** | | | | | | | |
| 1 | Piano ... ... ... ... ... ... | ..... | ..... | ..... | ..... | ..... | 0 6 6 | ..... |
| ... | Rafts of bamboos, No. 38470 ... ... ... | ..... | 1,018 | ..... | ..... | ..... | 17 4 9 | ..... |
| 1 | Total ... | ..... | 1,018 | ..... | ..... | ..... | 17 11 3 | ..... |
| ... | Total of same month last year ... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

*Arrah Canal.*—(Continued.)

| Number of boats. | Nature of cargo. | Approximate Weight of cargo. | Approximate Value of cargo. | Tonnage of boats. Mds. | Tons. | Ton mileage. | Tollage. | Rate of toll per ton mile. |
|---|---|---|---|---|---|---|---|---|
| | (2) STORES AND MATERIALS FOR IRRIGATION WORKS. | | | | | | | |
| | | Mds. | Rs. | | | | Rs. A. P. | A. P. |
| 17 | Kunkur | 3,125 | 160 | 5,897 | 188 | 1,983 | 30 13 0 | ..... |
| 88 | Rubble | 9,000 | 289 | 24,103 | 889 | 23,887 | 415 4 6 | ..... |
| 9 | Heavy packing | 4,151 | 108 | 3,129 | 115 | 3,104 | 41 9 6 | ..... |
| 34 | Ashlar | 4,600 | 874 | 14,034 | 680 | 15,314 | 165 7 6 | ..... |
| 5 | Bricks | 3,240 | 65 | 5,895 | 217 | 5,847 | 80 12 6 | ..... |
| 1 | Engine | 76 | 3,000 | 390 | 14 | 200 | 3 0 9 | ..... |
| 1 | Grooves | 100 | 20 | 208 | 8 | 149 | 2 12 0 | ..... |
| 6 | Mile stones | 480 | 60 | 1,677 | 62 | 1,204 | 18 12 6 | ..... |
| 3 | Cake | 517 | 387 | 792 | 29 | 3,605 | 18 12 6 | ..... |
| 1 | Ropes | 52 | 42 | 157 | 6 | 151 | 1 3 6 | ..... |
| 2 | Timbers | 210 | 800 | 1,110 | 41 | 2,515 | 16 0 0 | ..... |
| 2 | Passenger boats | ..... | ..... | 1,015 | 37 | 3,653 | 21 14 0 | ..... |
| 4 | Coal | 800 | 500 | 1,750 | 65 | 1,742 | 23 5 6 | ..... |
| 110 | Empty boats | ..... | ..... | 15,039 | 574 | 16,078 | 105 11 3 | ..... |
| 253 | Total | 27,093 | 6,249 | 77,386 | 2,844 | 76,182 | 1,033 0 0 | 0 2·4 |
| ... | Total of same month last year | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| | MISCELLANEOUS. | | | | | | | |
| 1 | Crane | ..... | ..... | ..... | ..... | ..... | 10 6 3 | ..... |
| 3 | Office records | ..... | ..... | ..... | ..... | ..... | 3 0 0 | ..... |
| 4 | Total | ..... | ..... | ..... | ..... | ..... | 13 7 0 | ..... |
| ... | Total of same month last year | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

ABSTRACT, LOCAL TRAFFIC.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 38 | Private, including miscellaneous | 5,118 | 17,276 | 10,000 | 370 | 12,953 | 149 3 6 | ..... |
| 267 | Government stores, including miscellaneous | 27,033 | 6,289 | 77,386 | 2,844 | 76,482 | 1,040 13 6 | ..... |
| 305 | Grand Total | 32,151 | 23,565 | 87,446 | 3,214 | 92,435 | 1,190 1 0 | ..... |
| ... | Grand total of same month last year | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

*Western Main Canal.*

LENGTH OF CANAL OPEN—22 MILES.

LOCAL TRAFFIC.

(1) PRIVATE.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 8 | Linseed, wheat, castor seed, rice, and spices | 744 | 1,442 | 1,500 | 55 | 1,210 | 31 9 0 | ..... |
| 8 | Packing rubble | 5,056 | 463 | 8,225 | 302 | 1,510 | 51 6 6 | ..... |
| 1 | Straw, 1,300 bales | ..... | 6 | 373 | 14 | 70 | 2 5 6 | ..... |
| 33 | Empty boats | ..... | ..... | 3,600 | 133 | 1,052 | 24 10 6 | ..... |
| 55 | Total | 5,780 | 1,901 | 13,700 | 504 | 3,842 | 99 15 6 | 0 4·9 |
| ... | Total of same month last year | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

(2) STORES AND MATERIALS FOR IRRIGATION WORKS.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 12 | Bond stone | 5,668 | 510 | 9,050 | 333 | 2,665 | 56 9 0 | ..... |
| 4 | Rubble stone | 1,064 | 53 | 1,975 | 73 | 343 | 12 5 6 | ..... |
| 47 | Empty boats | ..... | ..... | 7,175 | 265 | 2,485 | 51 8 0 | ..... |
| 69 | Total | 6,732 | 563 | 18,200 | 669 | 4,515 | 120 6 6 | 0 5·1 |
| ... | Total of same month last year | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

ABSTRACT—LOCAL TRAFFIC.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 55 | Private | 5,780 | 1,901 | 13,700 | 504 | 3,842 | 99 15 6 | ..... |
| 69 | Government stores | 6,732 | 563 | 18,200 | 669 | 4,515 | 120 6 6 | ..... |
| 104 | Grand Total | 12,512 | 2,464 | 31,900 | 1,173 | 8,357 | 220 0 0 | ..... |
| ... | Grand total of same month last year | ..... | ..... | ..... | ..... | ..... | ..... | ..... |

ABSTRACT.

| Canals. | Tollage of the year 1877-78. | | Tollage of the year 1876-77. | | Remarks. |
|---|---|---|---|---|---|
| | During the month. | To end of month. | During the corresponding month. | To end of corresponding month. | |
| **Orissa Circle.** | Rs. A. P. | Rs. A. P. | Rs. A. P. | Rs. A. P. | |
| Kendraparah ... ... ... ... ... | 61 5 0 | 3,833 14 10 | 458 11 4 | 1,551 5 2 | |
| High Level, Section I ... ... ... ... | ..... | 808 14 0 | 173 9 1 | 398 15 10 | The canal was closed for repair. |
| Taldandah ... ... ... ... ... | 363 3 9 | 490 9 7 | 356 11 2 | 523 2 11 | |
| Total Orissa Circle ... | 424 8 9 | 5,131 6 5 | 987 15 7 | 2,453 7 11 | |
| **South-Western Circle.** | | | | | |
| Midnapore ... ... ... ... ... ... | 3,313 15 6 | 6,502 4 9 | 5,152 15 8 | 10,715 18 5 | |
| Hidgellee Tidal ... ... ... ... ... | 7,718 3 6 | 16,154 14 0 | 4,794 0 1 | 9,526 4 7 | |
| Total South-Western Circle, ... | 11,032 3 0 | 22,657 2 0 | 9,946 15 4 | 20,242 1 10 | |
| **Sone Circle.** | | | | | |
| Arrah ... ... ... ... ... | 1,196 1 0 | 2,612 9 3 | ..... | ..... | |
| Western Main ... ... ... ... | 220 6 9 | 547 12 6 | ..... | ..... | |
| Total Sone Circle ... | 1,416 7 0 | 3,160 5 9 | ..... | ..... | |
| Grand Total ... | 12,873 2 9 | 30,948 14 11 | 10,934 14 11 | 22,695 9 9 | |

G. A. Searle, *Col.*, R.C.,
*Asst. Secretary to the Government of Bengal,*
*in the P. W. Dept., Irrigation Branch.*

*The 14th July* 1877.

# GOVERNMENT OF BENGAL.

## PUBLIC WORKS DEPARTMENT, IRRIGATION BRANCH.

RUBBEE SEASON, 1876, COMMENCING ON THE 1st DECEMBER 1876.

*Irrigation Operations of Lower Bengal during the month of April 1877.*

| Circle. | District. | Canal. | Supply of Water in the Canals. | | Dalwa Rice Irrigation. | | | Tobacco, Cotton, Huldee, Ginger, Wheat, and Garden Produce. | | | Oil-seeds and Pulses. | | | Sugarcane and other Crops. | | | | Rainfall. | | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Estimated full discharge in cubic feet per second. | Average discharge in cubic feet per second throughout the month. | Area leased up to the 1st of the month. | Area leased during the month. | Total area leased up to the end of the month. | Area leased up to the 1st of the month. | Area leased during the month. | Total area leased up to the end of the month. | Area leased up to the 1st of the month. | Area leased during the month. | Total area leased up to the end of the month. | Area leased up to the 1st of the month. | Area leased during the month. | Total area leased up to the end of the month. | Grand total of area leased up to end of month (total of columns 8, 11, 14 and 17). | Grand total of corresponding period of last year. | Inches during month. | Inches during rubbee season. | Average of ten previous years for the same period. | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | |
| Orissa | Cuttack | Kendraparah | 1,289 | 461·89 | 2 | 11 | 13 | 1,908 | 258 | 2,098 | 110 | 5 | 115 | 45 | ... | 45 | 2,269 | 3,374 | 2·60 | 5·76 | 3·90 | (a) The details are— |
| | | Pattamoondee | ... | ... | ... | ... | ... | 39 | ... | 39 | 5 | ... | 5 | ... | ... | ... | 44 | ... | | | | |
| | | High Level, Sec. I | 675 | 139·42 | 27 | 4 | 31 | 21 | ... | 21 | 8 | ... | 8 | 7 | 1 | 8 | 68 | 79 | | | | |
| | | Toldmudah | 1,300 | 96·25 | ... | ... | ... | 175 | 11 | 186 | 41 | ... | 41 | 54 | 14 | 68 | 295 | 194 | | | | |
| | | Matchgong | 650 | 68·42 | ... | ... | ... | 140 | 32 | 172 | 23 | 4 | 27 | 16 | 30 | 46 | 245 | 197 | | | | |
| | Total of the month | | ... | ... | 29 | 15 | 44 | 2,183 | 331 | 2,514 | 187 | 9 | 196 | 122 | 45 | 167 | (a) 2,921 | 3,844 | ... | ... | ... | |
| | Total of the corresponding month of previous year | | ... | ... | 185 | 8 | 193 | 3,292 | 39 | 3,331 | 152 | 2 | 154 | 141 | 25 | 166 | 3,844 | ... | ... | ... | ... | |
| South-Western. | Midnapore | Midnapore | 875 | 119 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 26 | 3·24 | 10·24 | 8 years. 46·80 | Acres. |
| | Howrah | Panchkoorah | 300 | 19 | 78 | ... | 78 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 78 | 47 | 1·57 | 0·09 | 7 years. 3·36 | Daiwa ... ... 44 |
| | Total of the month | | ... | ... | 78 | ... | 78 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 78 | 73 | ... | ... | ... | Cotton ... ... 2,440 |
| | Total of the corresponding month of previous year | | ... | ... | ... | ... | ... | ... | ... | ... | 73 | ... | 73 | ... | ... | ... | 73 | ... | ... | ... | ... | Huldee ... ... 1 |
| Zone | Shahabad | Main Western | 4,342 | 568 | ... | ... | ... | 311 | ... | 311 | ... | ... | ... | 271 | 28 | 299 | 610 | 4,914 | 0·72 | 6·11 | Not stated. | Onions ... ... 23 |
| | | Arrah ... | 1,600 | 568 | ... | ... | ... | 8,195 | ... | 8,195 | 58 | ... | 58 | 2,265 | 1,455 | 3,720 | 11,973 | 27,654 | 0·72 | 5·75 | | Potatoes ... ... 2 |
| | Gya and Patna | Patna ... | 1,466 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1,328 | ... | 1·78 | | Chillies ... ... 2 |
| | Total of the month | | ... | ... | ... | ... | ... | 8,506 | ... | 8,506 | 58 | ... | 58 | 2,536 | 1,483 | 4,019 | (b) 12,583 | 33,896 | ... | ... | ... | Wheat ... ... 1 |
| | Total of the corresponding month of previous year | | ... | ... | ... | ... | ... | 31,766 | ... | 31,766 | 251 | ... | 251 | 1,879 | ... | 1,879 | 33,896 | ... | ... | ... | ... | Garden produce ... 38 |
| | Grand Total of the month | | ... | ... | 107 | 15 | 122 | 10,689 | 331 | 11,020 | 245 | 9 | 254 | 2,658 | 1,528 | 4,186 | 15,582 | 37,813 | ... | ... | ... | Chinna ... ... 6 |
| | Grand Total of the corresponding month of the previous year | | ... | ... | 185 | 8 | 193 | 35,938 | 39 | 35,997 | 476 | 2 | 478 | 2,020 | 26 | 2,046 | 37,813 | ... | ... | ... | ... | Mandia ... ... 1 |
| | | | | | | | | | | | | | | | | | | | | | | Oil-seeds ... ... 102 |
| | | | | | | | | | | | | | | | | | | | | | | Pulses ... ... 94 |
| | | | | | | | | | | | | | | | | | | | | | | Sugarcane ... 112 |
| | | | | | | | | | | | | | | | | | | | | | | Brinjals ... ... 37 |
| | | | | | | | | | | | | | | | | | | | | | | Plantains ... ... 5 |
| | | | | | | | | | | | | | | | | | | | | | | Saru ... ... 1 |
| | | | | | | | | | | | | | | | | | | | | | | Other crops ... 12 |
| | | | | | | | | | | | | | | | | | | | | | | Total ... 2,921 |
| | | | | | | | | | | | | | | | | | | | | | | (b) The details are— |
| | | | | | | | | | | | | | | | | | | | | | | Acres. |
| | | | | | | | | | | | | | | | | | | | | | | Wheat and barley at Rs. 2-8 per acre 8,567 |
| | | | | | | | | | | | | | | | | | | | | | | Opium at Rs. 5 ditto 58 |
| | | | | | | | | | | | | | | | | | | | | | | Sugarcane at Rs. 5 per acre ... 4,018 |
| | | | | | | | | | | | | | | | | | | | | | | Total ... 12,583 |

G. A. SEARLE, *Col.*, s.c.,
*Asst. Secretary to the Govt. of Bengal in the P. W. Dept., Irrigation Branch.*

*The 27th July* 1877.

# GOVERNMENT OF BENGAL.

## PUBLIC WORKS DEPARTMENT, IRRIGATION BRANCH.

RUBBEE SEASON 1876, COMMENCING ON THE 1st DECEMBER 1876.

*Irrigation Operations of Lower Bengal during the month of May* 1877.

| Circle. | District. | Canal. | Supply of Water in the Canals. | | Dalwa Rice Irrigation. | | | Tobacco, Cotton, Huldee, Ginger, Wheat, and Garden Produce. | | | Oil-seeds and Pulses. | | | Sugar-cane and other Crops. | | | Grand total of area leased up to end of month (total of columns 6, 11, 14, & 17). | Grand total of corresponding period of last year. | Rainfall. | | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Estimated full discharge in cubic feet per second. | Average discharge in cubic feet per second throughout the month. | Area leased up to the 1st of the month. | Area leased during the month. | Total area leased up to the end of the month. | Area leased up to the 1st of the month. | Area leased during the month. | Total area leased up to the end of the month. | Area leased up to the 1st of the month. | Area leased during the month. | Total area leased up to the end of the month. | Area leased up to the 1st of the month. | Area leased during the month. | Total area leased up to the end of the month. | | | Inches during month. | Inches during rubbee season. | Average of ten previous years for the same period. | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | |
| Orissa ... | Cuttack ... | Kendraparah ... | 1,289 | 443 | 13 | 10 | 23 | 2,696 | 89 | 2,185 | 315 | ..... | 115 | 45 | 45 | 88 | 2,411 | 3,889 | 5·77 | 11·83 | 7·22 | (a). The details are— |
| | | Pattamoondee ... | ..... | ..... | ..... | ..... | ..... | 39 | 3 | 42 | 5 | ..... | 5 | ..... | 1 | 1 | 48 | 3 | | | | Acres. |
| | | High Level, Sec. I | 675 | ..... | 31 | 147 | 178 | 21 | 1 | 22 | 8 | ..... | 8 | 8 | 4 | 13 | 220 | 82 | | | | Dalwa ... ... 201 |
| | | Taldunda ... | 1,300 | 85·94 | ..... | ..... | ..... | 186 | 1 | 187 | 41 | ..... | 41 | 68 | 2 | 70 | 298 | 200 | | | | Cotton ... ... 2,583 |
| | | Matchgong ... | 650 | 45·81 | ..... | ..... | ..... | 172 | 20 | 192 | 27 | ..... | 27 | 46 | 6 | 52 | 271 | 206 | | | | Huldee ... ... 1 |
| | | Total of the month ... | ..... | ..... | 44 | 157 | 201 | 2,514 | 114 | 2,628 | 196 | ..... | 196 | 167 | 56 | 223 | (a) 3,248 | 3,581 | ... | ... | ..... | Onion ... ... 28 |
| | | Total of the corresponding month of previous year ... ... ... ... | ..... | ..... | 193 | 1 | 194 | 3,331 | 19 | 3,350 | 154 | 2 | 156 | 106 | 15 | 121 | 3,881 | ..... | ... | ... | ..... | Potatoes ... ... 2 |
| | | | | | | | | | | | | | | | | | | | | | | Chillies ... ... 2 |
| | | | | | | | | | | | | | | | | | | | | | | Wheat ... ... 1 |
| | | | | | | | | | | | | | | | | | | | | | | Garden produce ... 29 |
| | | | | | | | | | | | | | | | | | | | | | | Chinna ... ... 6 |
| | | | | | | | | | | | | | | | | | | | | | | Mandia ... ... 1 |
| South-Western | Midnapore ... | Midnapore ... | 575 | 60 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 26 | 5·13 | 15·42 | 8 years. 10·19 | Oil-seeds ... ... 102 |
| | Howrah ... | Panchkoorah ... | 300 | 14 | 78 | ..... | 78 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 78 | 47 | 2·81 | 11·81 | 7 years. 7·05 | Pulses ... ... 94 |
| | | | | | | | | | | | | | | | | | | | | | | Sugar-cane ... ... 128 |
| | | | | | | | | | | | | | | | | | | | | | | Brinjals ... ... 37 |
| | | | | | | | | | | | | | | | | | | | | | | Plantains ... ... 5 |
| | | | | | | | | | | | | | | | | | | | | | | Saru ... ... 1 |
| | | | | | | | | | | | | | | | | | | | | | | Other crops ... 42 |
| | | Total of the month ... | ..... | ..... | 78 | ..... | 78 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 78 | 73 | ... | ... | ..... | Total ... 2,349 |
| | | Total of the corresponding month of previous year ... ... ... ... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 73 | ..... | 73 | ..... | ..... | ..... | 73 | ..... | ... | ... | ..... | (b). The details are— |
| Sone ... | Shahabad ... | Main Western ... | 4,342 | 538·35 | ..... | ..... | ..... | 311 | ..... | 311 | ..... | ..... | ..... | 299 | 3 | 302 | 613 | 4,914 | 1·33 | 7·64 | Not stated. | Acres. |
| | | Arrah ... | 1,660 | 538·33 | ..... | ..... | ..... | 8,195 | ..... | 8,195 | 58 | ..... | 58 | 3,720 | 576 | 4,296 | 12,549 | 27,654 | 4·60 | 10·35 | | Wheat and barley at Rs. 2·8 per acre ... 8,507 |
| | Gya and Patna ... | Patna ... | 1,466 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1,328 | 1·92 | 3·79 | | Opium at Rs. 5 per acre ... 58 |
| | | Total of the month ... | ..... | ..... | ..... | ..... | ..... | 8,506 | ..... | 8,506 | 58 | ..... | 58 | 4,019 | 579 | 4,598 | (b) 13,162 | 33,896 | ... | ... | ..... | Sugar-cane at Rs. 5 per acre ... 4,597 |
| | | Total of the corresponding month of previous year ... ... ... ... | ..... | ..... | ..... | ..... | ..... | 31,766 | ..... | 31,766 | 251 | ..... | 251 | 1,879 | ..... | 1,879 | 33,896 | ..... | ... | ... | ..... | Total ... 13,161 |
| | | Grand Total of the month ... | ..... | ..... | 122 | 157 | 279 | 11,020 | 114 | 11,134 | 254 | ..... | 254 | 4,186 | 435 | 4,621 | 16,488 | 37,859 | ... | ... | ..... | |
| | | Grand Total of the corresponding month of previous year ... ... ... ... | ..... | ..... | 193 | 1 | 194 | 35,097 | 19 | 35,116 | 405 | 3 | 409 | 2,045 | 15 | 2,060 | 37,859 | ..... | ... | ... | ..... | |

G. A. SEARLE, *Colonel*, B. C.,
*Asst. Secy. to the Government of Bengal*
*in the P. W. Dept., Irrigation Branch.*

*The 27th July* 1877.

# Reports of Fluctuation of Traffic on the Eastern Bengal Railway for the Month of June 1877.

EASTERN BENGAL RAILWAY COMPANY, TRAFFIC SUPERINTENDENT'S OFFICE, SEALDAH TERMINUS.

*Report on the Traffic for the five weeks ending 30th June 1877.*

Dated Calcutta, the 23rd July 1877.

From—JAMES BRANDER, Esq., Traffic Superintendent, Sealdah,

To—The Agent, Sealdah.

THE quantity of goods carried during the above period is maunds 8,40,998, as compared with 5,27,564 during the same period of last year, showing an increase of maunds 3,13,434.

The increase is chiefly attributable to the following staples, viz. grain including rice, hides, railway material salt, seeds, and miscellaneous articles.

The staples showing the greatest decrease are gunny bundles and bales, jute drums and bales, sugar, tobacco and turmeric.

*Increases.*

Grain, including rice ... ... ... ... ... Mds. 2,64,556

This staple still shows satisfactory increase, the exports continuing to a large extent.

Hides ... ... ... ... ... ... Mds. 3,319

The increase in this commodity is fluctuating, being regulated by the demand in the market.

There being no bales received as against 1,520 during this period last year, reduces the above actual increase nearly one-half.

Piece-goods ... ... ... ... ... Mds. 578

This shows a slight increase compared with former months, but the quantity carried is still satisfactory.

Railway material, foreign ... ... ... ... Mds. 25,384

This large increase is owing to the quantity of material being forwarded for the Northern Bengal State Railway.

Salt ... ... ... ... ... ... Mds. 34,224

The increase shown is very satisfactory, and justifies the expectations formed in regard to the increase in the quantity sent to the interior.

Seeds ... ... ... ... ... ... Mds. 57,307

This increase, though not so large as last month, is still satisfactory, and shows that the demand is unabated.

Miscellaneous goods ... ... ... ... ... Mds. 18,659

This increase, though also showing a falling off for last month, is nevertheless satisfactory, as showing that large quantities of goods are despatched upwards.

*Decreases.*

| | | Bundles. | Bales. |
|---|---|---|---|
| Gunny bundles and bales ... ... ... | Mds. | 4,980 | 1,848 |

The decrease in this article still continues, and will do so as long as there is a demand for gunnies for despatch of seeds, grain, &c., for the interior.

| | | Drums. | Bales. |
|---|---|---|---|
| Jute drums and bales ... ... ... | Mds | 41,404 | 3,731 |

The cause of this decrease is still the same low stock and no demand for export.

Sugar ... ... ... ... ... Mds. 8,270

This decrease is owing (as said in the last report) to the early closing of the season and the advent of the rains.

| | | Tobacco. | Turmeric. |
|---|---|---|---|
| Tobacco and turmeric ... ... ... | Mds. | 25,906 | 4,417 |

These articles are regulated by the demand in the market, and this being small, there is little inducement to export them from the interior.

I attach the usual statement showing the increases and decreases of the principal staples.

EASTERN BENGAL RAILWAY.

*Statement showing Increases and Decreases in goods conveyed over the line for the five weeks ended 30th June 1877, as compared with corresponding period of 1876.*

| STAPLES. | 1876. | 1877. Up. | 1877. Down. | Increases. | Decreases. |
|---|---|---|---|---|---|
| Ale, beer, wine, &c. ... ... ... ... | 765 | 1,036 | ..... | 271 | ..... |
| Cotton, bundles of ... ... ... ... ... | 324 | 1,831 | 874 | 2,381 | ..... |
| Ditto, bales of ... ... ... ... ... | 1,284 | 16 | ..... | ..... | 1,268 |
| Grain, including rice ... ... ... ... | 33,252 | 5,238 | 2,92,564 | 2,64,550 | ..... |
| Gunny, bundles of ... ... ... ... ... | 7,840 | 2,109 | 451 | ..... | 4,980 |
| Ditto, bales of ... ... ... ... ... | 9,773 | 47 | 7,880 | ..... | 1,848 |
| Hides, bundles of ... ... ... ... ... | 7,072 | 186 | 10,205 | 3,319 | ..... |
| Ditto, bales of ... ... ... ... ... | 1,520 | ..... | ..... | ..... | 1,520 |
| Jute, drums of ... ... ... ... ... | 1,03,059 | 34 | 61,651 | ..... | 41,404 |
| Ditto, bales of ... ... ... ... ... | 4,835 | ..... | 1,104 | ..... | 3,731 |
| Piece-goods ... ... ... ... ... | 20,840 | 21,300 | 118 | 578 | ..... |
| Railway material, foreign ... ... ... ... | 6,335 | 31,719 | ..... | 25,384 | ..... |
| Salt ... ... ... ... ... | 58,598 | 92,822 | ..... | 34,224 | ..... |
| Seed ... ... ... ... ... | 1,31,770 | 258 | 1,88,909 | 57,307 | ..... |
| Sugar ... ... ... ... ... | 17,846 | 168 | 9,418 | ..... | 8,270 |
| Tea ... ... ... ... ... | 1,095 | 4 | 524 | ..... | 567 |
| Tobacco ... ... ... ... ... | 42,238 | 455 | 16,187 | ..... | 25,986 |
| Twist ... ... ... ... ... | 3,482 | 4,142 | ..... | 660 | ..... |
| Turmeric ... ... ... ... ... | 11,411 | 240 | 6,748 | ..... | 4,417 |
| All other goods ... ... ... ... ... | 63,895 | 45,588 | 36,876 | 18,659 | ..... |
| Total ... | 5,27,564 | 2,07,489 | 6,33,509 | 4,07,423 | 93,989 |
| | | | 2,07,489 | | |
| | | | 8,40,998 | | |
| Less decreases ... | ..... | ..... | 5,27,564 | 93,989 | |
| Net increases ... | ..... | ..... | 313 | 434 | |

## TIRHOOT STATE RAILWAY.

TRAFFIC DEPARTMENT.

*Statement showing the Fluctuations in the principal Staples of Traffic for the month of June 1877.*

| Staples. | Increase. Up. Mds. | Increase. Down. Mds. | Decrease. Up. Mds. | Decrease. Down. Mds. |
|---|---|---|---|---|
| Rice ... ... ... | ..... | ... | 168 | 202 |
| Pulses ... ... ... | 3,440 | ... | ... | ..... |
| Other food-grains ... ... ... | 713 | 795 | ... | ..... |
| Oil-seed ... ... ... | ..... | ... | ... | 13,153 |
| Salt ... ... ... | 4,532 | 396 | ... | ..... |
| Piece-goods, cotton (European) ... | ..... | ... | 56 | ..... |

W. M. JOHNSTON, *Asst. Traffic Superintendent.*

# Weekly Return of Traffic Receipts on Indian Railways.

## EAST INDIAN RAILWAY—MAIN LINE.

*Approximate Return of Traffic for week ended 21st July 1877, on 1,279¾ miles open.*

| | Coaching Traffic. | | | Merchandise and Mineral Traffic. | | | Total Traffic Receipts. | Train Miles run. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. of passengers. | Coaching receipts. | | Weight carried. | Receipts. | | | Coaching. | Merchandise. | Total. |
| | | Rs. A. P. | £ s. d. | Mds. Sr. | Rs. A. P. | £ s. d. | Rs. A. P. | | | |
| Total traffic for the week ... | 130,878 | 1,50,922 10 9 | 13,834 11 6 | 13,62,106 0 | 6,02,123 0 9 | 55,194 12 5 | 7,53,045 11 6 | 44,399¼ | 123,091¼ | 167,491 |
| Or per mile of railway ... ... | .... | 117 14 11 | 10 16 8 | .... | 470 8 0 | 43 2 7 | 588 6 11 | .... | .... | .... |
| For previous 2 weeks of half-year | 269,161 | 2,90,017 10 9 | 26,584 10 1 | 26,20,007 10 | 12,25,014 10 9 | 112,378 10 3 | 15,15,032 5 6 | 88,893½ | 229,071¼ | 317,954¾ |
| Total for 3 weeks ... | 409,039 | 4,40,940 5 6 | 40,419 10 7 | 39,82,203 10 | 18,28,037 11 6 | 167,573 2 8 | 22,68,078 1 0 | 133,292¼ | 352,163¼ | 485,445¾ |
| COMPARISON. | | | | | | | | | | |
| Total for corresponding week of previous year ... ... ... | 165,467¼ | 1,24,905 13 11 | 11,449 14 1 | 7,93,480 0 | 3,80,355 7 0 | 34,865 19 5 | 5,06,261 5 5 | 43,008 | 72,494 | 115,500 |
| Or mile of railway, corresponding week of previous year ... | ..... | 97 9 8 | 8 18 11 | ..... | 297 3 4 | 27 4 11 | 394 13 0 | ..... | ..... | ..... |
| Total to corresponding date of previous year ... ... ... | 347,503 | 3,99,472 0 1 | 36,618 5 4 | 27,09,173 30 | 12,83,998 1 3 | 117,691 11 0 | 16,83,380 1 4 | 133,625 | 236,490 | 370,115 |

## EAST INDIAN RAILWAY—JUBBULPORE LINE.

*Approximate Return of Traffic for week ended 21st July 1877, on 223¾ miles open.*

| | | Rs. A. P. | £ s. d. | Mds. Sr. | Rs. A. P. | £ s. d. | Rs. A. P. | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Total traffic for the week ... | 5,294¼ | 12,636 5 3 | 1,158 6 6 | 2,76,491 0 | 75,857 14 3 | 6,953 12 9 | 88,494 3 0 | 4,651 | 22,844 | 27,495 |
| Or per mile of railway ... | ..... | 56 7 7 | 5 3 6 | ..... | 339 0 6 | 31 1 7 | 395 8 1 | ..... | ..... | ..... |
| For previous 2 weeks of half-year | 10,853¼ | 25,940 11 3 | 2,378 14 5 | 5,07,920 0 | 1,17,746 2 0 | 10,793 7 11 | 1,49,480 13 3 | 9,407¾ | 29,168¼ | 38,576¼ |
| Total for 3 weeks ... | 16,158 | 38,580 0 6 | 3,537 1 11 | 7,83,411 0 | 1,93,604 0 3 | 17,747 0 8 | 2,32,190 0 9 | 14,058¾ | 52,012¼ | 66,071¼ |
| COMPARISON. | | | | | | | | | | |
| Total for corresponding week of previous year ... ... ... | 5,949¼ | 11,350 7 9 | 1,040 9 3 | 34,290 30 | 9,911 10 0 | 908 11 3 | 21,262 1 9 | 4,280 | 2,871 | 7,160 |
| Or mile of railway, corresponding week of previous year ... | ..... | 50 11 8 | 4 13 0 | ..... | 44 4 9 | 4 1 3 | 95 0 5 | ..... | ..... | ..... |
| Total to corresponding date of previous year ... ... | 12,722¼ | 34,332 12 3 | 3,147 3 5 | 1,27,820 20 | 34,576 0 9 | 3,169 8 3 | 68,908 3 0 | 13,578 | 9,444 | 23,016 |

## NALHATI STATE RAILWAY.

*Approximate Return of Traffic for week ended 21st July 1877, on 27¼ miles open.*

| | Coaching Traffic. | | | Merchandise and Mineral Traffic. | | | Total receipts. |
|---|---|---|---|---|---|---|---|
| | Number of passengers. | Coaching receipts. | | Weight carried. | Receipts. | | |
| | | Rs. A. P. | £ s. d. | Mds. Srs | Rs. A. P. | £ s. d. | £ s. d. |
| Total traffic for the week ... ... ... ... | 2,300 | 1,124 0 0 | 112 8 0 | 9,624 0 | 702 0 0 | 70 4 0 | 182 12 0 |
| Or per mile of railway ... ... ... ... | 88 | 41 8 0 | 4 3 0 | 363 0 | 25 8 0 | 2 11 0 | 6 14 0 |
| For previous 2 weeks of half-year ... ... | 4,263 | 1,928 0 0 | 192 16 0 | 21,454 0 | 1,473 0 0 | 147 6 0 | 340 2 0 |
| Total for 3 weeks ... | 6,663 | 3,052 0 0 | 305 4 0 | 31,078 0 | 2,175 0 0 | 217 10 0 | 522 14 0 |
| COMPARISON. | | | | | | | |
| Total for corresponding week of previous year | 1,059¼ | 903 11 0 | 90 7 4 | 1,012 28 | 241 14 3 | 24 3 9 | 114 11 1 |
| Per mile of railway, corresponding week of previous year ... ... ... ... | 72 | 83 2 6 | 8 6 5 | 70 8 | 8 14 0 | 0 17 9 | 4 4 0 |
| Total to corresponding date of previous year | 6,151 | 3,038 12 3 | 305 17 6 | 6,582 28 | 802 0 0 | 80 3 11 | 386 1 5 |

## EASTERN BENGAL RAILWAY.

*Approximate Return of Traffic for week ended 21st July 1877, on 158¼ miles open.*

| | | Rs. A. P. | £ s. d. | Mds. Sr. | Rs. A. P. | £ s. d. | £ s. d. |
|---|---|---|---|---|---|---|---|
| Total traffic for the week ... ... ... ... | 35,191¼ | 21,907 8 0 | 2,008 5 9 | 3,07,670 20 | 58,166 4 4 | 5,331 18 2 | 7,340 1 11 |
| Or per mile of railway ... ... ... | 222 | 138 0 11 | 12 13 10 | 1,944 11 | 367 9 0 | 33 13 10 | 46 7 8 |
| For previous 2 weeks of half-year ... ... | 69,344¾ | 43,044 14 3 | 4,028 5 8 | 6,05,120 13 | 1,09,019 6 1 | 9,230 18 9 | 13,279 4 5 |
| Total for 3 weeks ... | 104,540 | 65,852 6 3 | 6,036 9 5 | 9,02,790 33 | 1,69,036 10 5 | 14,592 16 11 | 20,619 6 4 |
| COMPARISON. | | | | | | | |
| Total for corresponding week of previous year | 26,030 | 18,176 5 0 | 1,666 3 3 | 1,30,920 28 | 28,780 1 10 | 2,636 3 6 | 4,304 6 9 |
| Per mile of railway, corresponding week of previous year ... ... ... ... | 187 | 114 13 9 | 10 10 7 | 827 12 | 181 13 10 | 16 13 5 | 27 4 0 |
| Total to corresponding date of previous year | 99,043 | 63,250 14 9 | 5,793 0 0 | 4,47,920 10 | 98,750 14 9 | 8,185 10 0 | 15,935 10 0 |

## CALCUTTA AND SOUTH-EASTERN STATE RAILWAY.

*Approximate Return of Traffic for week ended 21st July 1877, on 28 miles open.*

| | | Rs. A. P. | £ s. d. | Mds. Sr. | Rs. A. P. | £ s. d. | £ s. d. |
|---|---|---|---|---|---|---|---|
| Total traffic for the week ... ... ... ... | 6,591 | 1,294 0 0 | 122 8 0 | 15,691 0 | 329 0 0 | 32 18 0 | 175 6 0 |
| Or per mile of railway ... ... ... ... | 300 | 46 8 0 | 4 7 0 | 560 0 | 19 0 0 | 1 18 0 | 6 5 0 |
| For previous 2 weeks of half-year ... ... | 17,086 | 3,604 0 0 | 260 8 0 | 28,302 0 | 928 0 0 | 92 16 0 | 353 4 0 |
| Total for 3 weeks ... | 20,077 | 3,898 0 0 | 382 16 0 | 43,993 0 | 1,457 0 0 | 145 14 0 | 528 10 0 |
| COMPARISON. | | | | | | | |
| Total for corresponding week of previous year | 6,443¾ | 904 13 9 | 90 9 8 | 7,754 0 | 228 5 9 | 22 16 8 | 113 6 4 |
| Per mile of railway, corresponding week of previous year ... ... ... ... | 230 | 32 5 0 | 3 4 7 | 277 0 | 8 2 6 | 0 16 6 | 4 0 11 |
| Total to corresponding date of previous year | 21,009¾ | 3,112 13 0 | 311 5 6 | 34,964 20 | 1,087 7 3 | 108 14 9 | 420 0 3 |

Printed and published by Edwin Morris Lewis, at the Printing Office of the Bengal Secretariat, No. 28, Chowringhee, in the City of Calcutta,—1st August 1877.

[REGISTERED NO. 39.]

No. 32 of 1877.

# SUPPLEMENT TO
# The Calcutta Gazette.

WEDNESDAY, AUGUST 8, 1877.

## OFFICIAL PAPERS.

*Non-Subscribers to the* GAZETTE *may receive the* SUPPLEMENT *separately on payment of Six Rupees per annum if delivered in Calcutta, or Twelve Rupees if sent by Post.*

CONTENTS.



## ENQUIRY INTO THE THEORY OF EPIDEMIC FEVER BEING CAUSED SOLELY BY OBSTRUCTIONS TO NATURAL DRAINAGE.

FINANCIAL DEPARTMENT.—SANITATION.

*Calcutta, the 31st July 1877.*

READ again the following papers:—

Memorandum by Rajáh Digumber Mitter, C.S.I., dated the 16th December 1876, adducing instances in support of his theory that the sole cause of the epidemic fever which of late years has prevailed in the districts round Calcutta lies in the obstructions caused to the natural drainage of the country by the construction of railways, roads, and embankments.

Minute recorded by Sir Richard Temple, dated the 5th January 1877, on the subject.

Sanitation Collection I, January 1877, Nos. 3 to 7.

Sanitation Collection I, February 1877, Nos. 10 to 14.

Sanitation Collection I, March 1877, Nos. 23 to 27, relative to the appointment of a special committee, consisting of the following gentlemen, to inquire into the obstructions to the drainage in the districts around Calcutta, and to make a careful inspection of the general features of the fever-stricken tract, after consulting all the reports that had been written on the subject of the fever, viz.—

The Sanitary Commissioner for Bengal ... *President.*

Mr. J. Whitfield, C.E., Executive Engineer,
Baboo Amrita Lal Mozoomdar, Assistant Surgeon,
Baboo Peari Mohun Mookerjee, } *Members.*

The District Magistrates, Executive Engineers, and Civil Surgeons of Howrah, Hooghly, Burdwan, Nuddea, Jessore, and 24-Pergunnahs,—*ex officio* members, as far as their own districts are concerned.

Deputy Collector Baboo Hem Chunder Kerr, Member and Secretary

Letter from the Sanitary Commissioner for Bengal, No. 594MI, dated the 15th May 1877.

Letter to the Sanitary Commissioner for Bengal, No. 1628, dated the 29th May 1877.

Read—

The Report of the Committee of Inquiry, dated the 4th July 1877.

At the outset of the proceedings the Sanitary Commissioner reported that in the absence of precise definition of the limits of the investigation, the work before the Committee was one of very great magnitude, while at the same time it appeared that Rajah Digumber Mitter and his friends were opposed to any lengthened investigation, believing that the truth of their theory was already fully established, and that it only remained for Government to take action to secure the proper drainage of villages. Dr. Lethbridge, while unable to accept the view that dampness of subsoil could be the sole and only cause of the fever, or that this dampness, which is general in Lower Bengal, had been brought about by roads and railways, yet thought that while inquiring into the causes of the dampness in the tracts subject to the epidemic fever, which was an admitted factor in the production of the disease, the Committee might set itself to devise a general scheme for providing sufficient drainage for this tract, and he suggested that the engineering element on the Committee should be strengthened for the purposes of an inquiry of this nature.

2. In reply to this proposal the Lieutenant-Governor observed that while Rajah Digumber Mitter's theory was possibly right in some respects, artificial obstructions having in many cases occasioned, and in others aggravated, the outbreak of fever, it had nevertheless been repeatedly demonstrated that the fever had prevailed in villages and in parts of the country on which roads and railways had had no possible influence. At the same time, much had already been done in the way of devising drainage schemes in both Hooghly and Burdwan. Less than two years ago a commission had been appointed for this very purpose, but general drainage works had nevertheless not been undertaken, simply because all such schemes were practically impossible. Special schemes under special laws had been carried out, and might still be taken up if the funds were forthcoming and good reason shown in each particular case. It was impossible for Government to undertake drainage works except at the invitation and with the co-operation of the landholders and others concerned. Admitting, however, that the question of drainage was of the highest importance, and that the present Committee might throw some further light on it by minute local inquiry, the Lieutenant-Governor requested them to examine, in the first instance, the specific localities of Shibpore, Bally, and Connagore, referred to in the Rajah's memorandum, in order that it might be seen from their investigations there whether there were grounds for continuing the investigation.

3. The report of the Committee has now been received, and it leaves matters exactly in the position described in the above letter. As regards the particular instances of artificially obstructed drainage referred to by Rajah Digumber Mitter in support of his special views, the facts ascertained by the Committee do not bear out his theory. But neither, on the other hand, do they disprove the position that the saturation of the subsoil in the Deltaic districts of Bengal is one chief cause of fever, or that this saturation may have been aggravated of late years by both natural and artificial changes.

4. Even were the measures which Government ought to adopt clear and indisputable, the present financial condition of the province prevents it from undertaking anything like a general system of district drainage at the cost of the public revenues. But if in any particular case it is found that improvement can be effected by means of manageable local schemes, and that those benefited are willing and able to pay for the necessary works, Government will be very ready to assist such enterprise by every means in its power. The Embankment Act [VI (B.C.) of 1873] leaves ample power of initiation to the local authorities, and even minor obstructions, such as those described by Sir William Herschel in his note appended to the report of the Committee, may and ought to be removed under the provisions of that Act.

5. For the rest, all that Government can do is to warn its Public Works Department to see that in all projects for roads careful attention is paid to this question of drainage, and if in any place it is found that existing roads

and works injuriously affect the outfall, such measures as are practicable must be taken to remedy the defect.

6. The thanks of Government are due to the members of the Committee, official and non-official, for the trouble they have taken in carrying out the work assigned to them. It is not, however, necessary that they should continue their sittings.

ORDERED—That this resolution, together with the papers read above, (with the exception of Sanitation Collection I, for January, February, and March,) be published in the *Calcutta Gazette*.

ORDERED also that a copy of this resolution be forwarded to the Secretary to this Government in the Public Works Department for information, with special reference to the fifth paragraph, and to Rajah Digumber Mitter, C.S.I., and the Sanitary Commissioner for Bengal for information.

Also to the Board of Revenue and the Commissioner of the Burdwan Division for information.

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*Memorandum by* RAJAH DIGUMBER MITTER, C.S.I., *showing the manner in which impediments have been offered to the drainage of some of the villages out of many.— Calcutta, the 16th December* 1876.

*Seebpore*—Situate opposite Fort William. The impediment to the drainage of this village has been offered by the filling up of a big drain which was called the Chowdhry's Gurh. This was done by the Howrah Municipality between April and June of 1873, and the fever broke out in September following.

*Bally*.—The drainage of the village is interfered with by the construction of a metalled road about four years ago from the railway station running southward, crossing the drainage channel of the village. This road was kutcha before, and the monsoon water made its way to its outfall—the Bally Khal—by making several breaches in the road, which, having been filled up without substituting culverts for them, and the pucka road being much higher and stronger, the drainage cannot make its way over and through it into the khall, as it did when the road was kutcha

Besides this, the surplus low lands on either side of the railway line having been recently sold by Government, their present owners have converted them into tanks and gardens, offering additional obstruction to the passage of the drainage through them into the khall.

The drainage is also obstructed by a number of kutcha roads which have been constructed recently.

*Connagore*—Situate within the Municipality of Serampore. The drainage of this place ultimately discharged itself into its natural outfall, the Bally Khall. Obstructions have been offered to the drainage in the interior of the village by roads without culverts crossing the drainage channel, by the gradual silting up of the drains, and their encroachment by the owners of the adjoining gardens. Lastly, the surplus railway lands through which the drainage ultimately made its way into its natural outfall, the Bally Khal, having been sold by Government about three years ago, their present owners have converted them into tanks and gardens, thus cutting off the village completely from its outfall. When in June last I had the honor of sending a similar memorandum to His Honor, I observed in respect of this village: "It is apprehended that the epidemic will break out with greater virulence after the next rainy season than it has done before." I am sorry to say that my prediction has been fully verified. Those that can afford are removing from the village.

The Eastern Bengal Railway has intercepted the drainage of these villages from finding its way into bheels Burroti and Muthoora. These places, which were noted for their healthiness, after passing through the active stage of the epidemic fever which broke out within a year or two of the construction of the railway embankment alongside of them, have, like Choonakhally, Bhatpara, Cossimbazar, Kalkapore, Bamunghatta, and Sydabad, lapsed into a chronic state of unhealthiness.

A line of villages extending from Itchapore, adjoining the Nawabgunge Powder Manufactory, to Chogdah.

*Minute by the Lieutenant-Governor of Bengal, dated the 5th January 1877.*

A VERY general impression prevails among many native gentlemen of position and intelligence in Bengal that the disastrous fever which frequently breaks out in the districts round Calcutta is attributable to the obstructed drainage of the country. This is the view which has been publicly maintained with great ability and earnestness by Baboo (now Rajah) Digumber Mitter, C.S.I. According to these gentlemen the construction of railways and roads has blocked up many channels and outlets through which the drainage of the country formerly flowed. I have had the advantage of personally discussing the subject with Rajah Digumber Mitter, and he has at my request furnished me with a memorandum giving, in support of his theory, a number of instances in which, as he contends, the fever is plainly and directly attributable to obstructed drainage. A copy of this memorandum is annexed to this minute. There is undoubtedly a great deal of *primâ facie* evidence in support of the Rajah's theory; and the subject is one of such importance to the welfare of the people that I think a special Committee should be appointed to examine the localities mentioned in the Rajah's memorandum, and any other localities which the Rajah or his friends may be able to indicate. I do not of course wish the Committee to confine their attention to these localities alone; they should examine other fever-stricken villages as well, in order that any conclusion at which they may arrive may be arrived at, not from a mere casual examination of a few selected villages, but from a careful inspection of the general features of the fever-stricken tract. The Committee should also consult the various reports which have from time to time been written upon this fever, and which contain much valuable information.

The Committee will be constituted as follows:—

The Sanitary Commissioner for Bengal.

An irrigation officer of the rank of an Executive Engineer, to be selected by Colonel Haig.

A Native Assistant Surgeon, to be nominated by the Surgeon-General.

Baboo Hem Chunder Kerr, Deputy Collector, or some other Deputy Collector to be named by the Secretary in the event of Hem Chunder Kerr not immediately returning from his special deputation in Rajshahye.

Baboo Shib Chunder Deb, an ex-Deputy Collector, now residing at Howrah.

If the latter gentleman is unable to act upon the Committee, Baboo Peary Churn Mookerjee of Ooturpara may be asked to serve in his place.

A copy of this minute will be sent to Colonel Haig, Secretary, Irrigation Department, to Dr. Beatson, Surgeon-General, and to Rajah Digumber Mitter, C.S.I.

RICHARD TEMPLE.

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No. 594MI, dated Calcutta, the 15th May 1877.

From—A. S. LETHBRIDGE, ESQ., M.D., Offg. Sanitary Commissioner for Bengal,
To—The Secretary to the Government of Bengal, Financial Department.

I HAVE the honor to inform you that I received charge of this office from Dr. Coates on the 7th instant.

On my arrival I found one important subject in connection with this appointment that required my immediate attention.

At Delhi, and just previous to his departure from the province, Sir Richard Temple issued orders appointing a committee to inquire into the obstructions to drainage in the districts around Calcutta, with the view chiefly of testing by local inquiry Rajah Digumber Mitter's theory regarding the causes of the severe fever which has for some years prevailed in Bengal.

A subsequent order, dated 27th February, indicates that the districts to be included in the inquiry are Howrah, Hooghly, Burdwan, Nuddea, Jessore, and the 24-Pergunnahs.

Since my arrival I have devoted most of my time to reading carefully all previous reports and correspondence on the subject, and have had the advantage of a personal interview with Rajah Degumber Mitter.

The work suggested by Sir Richard Temple's minute is of such magnitude that I regret not having had an opportunity of verbally bringing the subject in all its bearings before His Honor the Lieutenant-Governor.

At a preliminary meeting of the Committee held this morning it was resolved to submit, for the information of Government, a sketch showing the direction the inquiry ought to take, and the means to be employed for obtaining the required information. While this is under deliberation, I trust it will not be considered uncalled for if I record here the results of my unprejudiced study of the question.

The Government may be surprised to learn that Rajah Digumber Mitter and those with him who have helped for some years to keep this question before the public are opposed to any elaborate and lengthened investigation, believing, as they do, that their view has already been proved to be the right one, and therefore, according to them, it only remains for the Government to take practical action in the matter. What is meant by this is clearly stated in Rajah Digumber Mitter's pamphlet, page 5, of which the following is an extract:—

"I have already alluded to the provision in the Embankment Act of 1873 for the preservation of drainage channels, and the circular of the Board of Revenue on the subject; but they are, I humbly submit, not sufficient. There ought to be a regular organized agency for the execution of this work, so essential to the health of the people. What is required is not large expenditure of money, but a careful, constant, and minute attention to the drainage of the villages; and this attention cannot be secured unless there be an agency whose duty it shall be to report every obstruction to drainage, and to remove it wherever and whenever it may occur. This work, I think, ought to be performed by the Municipal, the Road Cess, and the Embankment establishments, acting under the orders of some central authority, be it the Sanitary Commissioner or the Superintending Engineer. The work after all belongs to the domain of what is called sanitary engineering, and if the Government, through the Public Works Department should make it a rule that the proper drainage of villages shall be maintained by the agencies I suggest, and should now and then make small contributions in aid of local funds for the execution of necessary improvements for efficient drainage, the object aimed at will, I am confident, be attained."

It was shown by the Epidemic Commission of 1864 that the fever then prevailing was of malarious origin, and that the chief factor in its development was unusual dampness of the subsoil. With one or two exceptions, all subsequent inquirers (and they have been many) are of the same opinion, and for all practical purposes it may be accepted that these two points are now established. It is when we come to account for the unusual dampness that we find a very considerable difference of opinion.

While I refrain from discussing the question here, I ought to mention that I cannot altogether accept Rajah Digumber Mitter's view of the dampness of the village subsoil itself being the sole and only cause of the fever, or that this has altogether been brought about by roads and railways; yet I am so profoundly impressed with the evidence that goes to show that long-continued dampness, at a time of the year when the soil ought to be rapidly drained of its excess of moisture, is the chief cause of unhealthiness, that I accept the Rajah's recommendations for facilitating the drainage of villages as being worthy of serious consideration.

Apart from the epidemic or severe types of malarious fevers, tropical diseases of all kinds are so directly influenced by a damp subsoil that the question of drainage in a country occupying the delta of a tropical river must be a matter of vital importance to its inhabitants, and therefore a subject of the deepest concern to its Government.

It cannot be denied that up to the present there has been no organized agency for facilitating drainage, or for restraining those who, from ignorance or self-interest, deliberately obstruct it.

If the Committee, while inquiring into the causes of the excessive dampness, could at the same time suggest reasonable means for removing it by utilising the natural drainage of the country, they would, even if they failed to elucidate the cause, confer a tangible and lasting benefit on the inhabitants of the province.

I venture to think that the Bengal Government has the power in its existing laws to organize a regular scheme for providing sufficient drainage without materially interfering with the cultivation of paddy, and I would gladly see the services of the Committee utilised for this purpose.

If the suggestion here offered was adopted, it would be necessary to increase the engineering element in the Committee by deputing a special officer for the work. At present thet Committee has only the part services of an officer who has many other importan duties to perform.

The extra work thrown on this office would also be very considerable; but, regarding it as a most important sanitary undertaking, I would gladly take my part in it.

---

No. 1628, dated Calcutta, the 29th May 1877.

From—H. J. S. COTTON, Esq., Junior Secretary to the Government of Bengal,
To—The Sanitary Commissioner, Bengal.

I AM directed to acknowledge the receipt of your letter No. 594, dated 15th May 1877, in which you discuss the functions of the Committee appointed to inquire into the obstructions to drainage around Calcutta. Your letter No. 3, dated 17th May 1877, with which you forward a copy of the preliminary proceedings of the Committee, has also been received and been laid before the Lieutenant-Governor.

2. Mr. Eden understands Sir Richard Temple's desire to have been that the Committee should inquire into and report how far Rajah Digumber Mitter's theory that the epidemic fever is exclusively attributable to artificial obstructions to the drainage of the country is true or not. The Rajah maintains that by the construction of roads and embankments the natural drainage of the country has been obstructed, and that this is the sole and only cause of the fever. But it has been demonstrated again and again that the fever has prevailed in villages and in parts of the country with which roads and railways can have had no possible concern. On the other hand, it has equally been shown that the Rajah is right to a very great extent, and that artificial obstructions have in many cases occasioned, and have in others aggravated, the outbreak of fever. The functions of the Committee, according to their original scope, would then seem to be to show categorically that in certain specified villages the theory of Rajah Digumber Mitter is sound and true, while in others it has no application. The Lieutenant-Governor, however, understands from your letter that this is not the object to which the Rajah himself would wish to see the energies of the Committee to be devoted. Assuming artificial obstructions to be the cause of the fever, it is desired by the promoters of the commission that Government should take practical action in the matter by removing obstacles and affording every facility for drainage in the affected tracts.

3. There is little doubt that the epidemic fever is of malarious origin, and that, while the chief factor in its development is unusual dampness in the subsoil, this dampness is created by defective drainage. The Lieutenant-Governor observes that, accepting this view, you confine yourself in your letter to recommending action in the direction of increased and improved drainage. If the Committee, you write, while inquiring into the cause of the excessive dampness, could at the same time suggest reasonable means for removing it by utilising the natural drainage of the country, they would, even if they failed to elucidate the cause, confer great benefits on the people; and you go on to say that you would gladly see the services of the Committee utilised in the organization of a general drainage scheme.

4. The Lieutenant-Governor, however, is obliged to point out that this proposal is not new, and that much has already been done in the way of devising drainage schemes in the districts of Hooghly and Burdwan. It is less than two years ago since the last commission, consisting of a sanitary officer and an engineer, was appointed for this purpose. General drainage works have nevertheless never been undertaken. It is only special schemes, such as the Dancoonee drainage project, that have been carried out, and these have been done under special laws passed to facilitate their operation. It is not possible for Government to undertake drainage works, except at the invitation and with the co-operation and at the expense of the landholders and tenant-holders concerned.

5. The question of drainage is, however, of the very highest importance, and it is possible that the present Committee may be able to throw some additional light on the subject. As the sittings of the committee have commenced, the Lieutenant-Governor thinks that, under your guidance, they should proceed

with as little delay as possible to examine Seebpore, Bally, and Connagore, the places mentioned in Rajah Digumber's memorandum, and see if they can find from their investigations there whether there are any grounds for continuing the inquiry. The advantage of making a local investigation in these places is manifest, and after actual inquiry the Committee will be more qualified than it is at present to decide whether its labours can profitably be directed to any practical use. You are requested to submit a full report on the subject after visiting these localities.

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Dated the 4th July 1877.

From—The Committee appointed to inquire into the Obstructions to Drainage in the Districts around Calcutta,

To—The Junior Secretary to the Government of Bengal.

THE Committee appointed to inquire into the obstructions to drainage in the districts around Calcutta beg to report, for the information of His Honor the Lieutenant-Governor, that they have carried out the instructions contained in your letter No. 1628, dated 29th ultimo, and brought their labours to a close.

2. Rajah Degumber Mitter's memorandum, dated the 16th December 1876, which accompanied Sir Richard Temple's minute of the 5th January, was adopted as the basis of this inquiry, and special care was taken to see that the Rajah had every opportunity given him for substantiating his statements and proving the correctness of the theory which he has advocated for many years. After a careful local investigation into every statement made regarding Shibpore, Bally, and Connagore, the Committee have arrived at the following conclusions. At the same time it is necessary that we should state that we are not prepared to say that increased dampness is not one of the causes of the fever. This is also perhaps the proper place to mention that there is a popular idea that there is increased dampness in the villages around Calcutta.

3. SHIBPORE.—As regards Shibpore, the inquiry was directed towards the following points:—(1) the history of Chowdhry's Gurh, (2) its filling up and the effect produced on the drainage, (3) the history of the severe malarious fever which occurred in 1872 and 1873.

4. The inquiry would be incomplete if we did not at the outset notice the following statements, which first appeared in the columns of the *Hindoo Patriot* (December 29th, 1873) and subsequently in Rajah Degumber Mitter's Pamphlet, at page 85:—"While upon this subject, we may as well notice a striking illustration of the Hon'ble Degumber Mitter's theory, which has presented itself almost under the very nose of our authorities. At the latter end of September last the same epidemic fever which has for the last 14 years been desolating some of the fairest and healthiest parts of Bengal broke out most furiously in a village called Shibpore, which is situated over the water and nearly opposite the Fort, and enjoying the privileges and blessings of municipal government. For some days the number of deaths was more than thirty per day, and some idea might be formed of the virulence of the fever and the havoc already committed by it when we mention, on reliable authority, that in a particular locality of the village called Chowdhryparah nearly 25 per cent. of the population have been already carried away. The only sign yet exhibited by the local authorities of their knowledge of this terrible outbreak is the stereotyped order to clear the village of all vegetation, which—true to the saying মড়ার উপর খাঁড়ার ঘা, or 'slaying the thrice slain'—is being vigorously carried out. Now the real cause of the outbreak of the fever in Shibpore, as everywhere else, is so plain and palpable that it must obtrude itself upon every man's notice who would enter the village, unless his eyes and ears happened to be absolutely closed; for as soon as you enter the village and express your wish to know if any physical change had taken place in it immediately before the outbreak of the fever, every child will tell you that a big drain—traversing the place both north and south as well as east and west, and which goes by the name of Chowdhry's Gurh (গড়)—has been filled up by, or under the orders of, the Municipality between April and June last. This big drain cannot also possibly fail to strike any man as being the drainage channel of the village, carrying the periodical monsoon rainfall over the

village through a culvert in the road to its outfall, the Hooghly, by means of a creek which runs along the southern boundary of the Botanical Gardens. This drain, as already observed, was filled up between April and June last, and the epidemic fever—true to the law which governs it, as we have repeatedly shown in these columns—broke out at the latter end of September following. We are aware that it is hard for our rulers, learned in the abstruse laws of nature, to swallow such a simple cause as this explaining so important a phenomenon, which has for the last 14 years eluded the grasp of their own scientific officers. But whether our lamentations are heard or not, the very expression of them gives relief to our minds, and this is one excuse for recurring so often to the subject."

5. The Chowdhry's Gurh was originally a large excavation surrounding a house in the Chowdhryparah quarter of Shibpore. Considerable portions of this Gurh were filled up by the proprietors at periods varying from 50 years to 15 years ago, leaving a large excavation 600 feet long, 28½ feet wide, and 13½ feet deep. This was the so-called drain referred to in the memorandum. This limited portion of the original Gurh was let as a fishery, on the understanding that the ryot who held the lease also kept it clean. The latter clause was added because the Municipality had directed the Chowdhry's attention to its filthy state. Local evidence went to show, however, that even after this arrangement it continued to be a nuisance to the neighbourhood, emitting noxious effluvia when the water in it was low.

6. About the beginning of 1873 the Municipality noticed the dangerous proximity of the Gurh to the public road, and, with the view of preventing accidents to carriages and foot-passengers, called upon the proprietors to have it properly fenced in. The slight bamboo fence erected by the Chowdhries did not meet with the approval of the municipal authorities, and it was therefore decided that a substantial paling should be put up and the cost charged to the owners of the Gurh. Rather than pay what they considered an unreasonable charge, the Chowdhries offered to fill up the Gurh; and on this understanding the process of filling up was begun, the street-sweepings of Howrah being first used for the purpose. But as this was objected to by the inhabitants in the neighbourhood, the Chowdhries completed the work with soil from the adjoining land.

7. Contrary to the statement made by a former Magistrate of Howrah in his remarks in the Sanitary Report for 1873, it would appear that the work was completed between April and June 1873. There is still a depression along the whole length of the excavation to mark the spot where it existed; and this depression, as will be seen by a reference to map A, serves to carry off the surface drainage by the old culvert under the public road.

8. To enable the Committee to arrive at an accurate conclusion regarding the part taken by Chowdhry's Gurh in the drainage of this quarter of Shibpore, it was considered advisable to obtain a careful survey of the neighbourhood. This was done by a competent overseer of the Public Works Department under the guidance of Mr. Whitfield, and the result is shewn in map A. At the request of the other members of the Committee, Mr. Whitfield has drawn up a memorandum discussing this question by the light of facts supplied by the levels and survey giving the features and configuration of the ground, and he has proved to the satisfaction of the Committee that it is physically impossible that the filling up of the Chowdhry's Gurh can have caused any obstruction to the drainage.

9. The Committee also made a general examination of the spot, and held a careful local inquiry among the inhabitants best qualified to speak on the subject. The first point ascertained was the fact that, before any drainage towards the natural outfall (the *bheel*) can take place, the tanks in the neighbourhood, which are very numerous, must first be filled; and the Committee were taken from one such tank to another, in the supposed order in which they were to be filled. The Chowdhry's Gurh, from its size and position, acted in the same manner as regards drainage as did the other tanks, with this exception, that, being the last of the series, it filled only when all the other tanks had overflowed into it, and then, when it was itself full, discharged its surplus water into a drain running under the main road and communicating with the *bheel*. One native gentleman stated—and those who were present agreed with him—

that seven-eighths of the drainage of the whole area comprising Baniaparah, Deyparah, Chowdhryparah, Dhobaparah, and Dhurrumtollah, first passed into the neighbouring tanks and then by their overflow to the Gurh, and that only one-eighth found its way direct to the Gurh. The importance of this fact on the question at issue will be seen presently.

10. The meteorological records of Calcutta and Howrah show (and the local evidence is to the same effect) that the rainfall in 1872 was very deficient, viz. 46·6 inches, or 20 inches below the average of 30 years. In this year it was proved that the Gurh was dry, and that it could not therefore have acted as a drainage channel. The rainfall in 1873 was also insufficient, being 47·5 inches, or still nearly 20 inches below the average. The tanks were in consequence not filled with water, and therefore the Chowdhry's Gurh, if it had remained open, could not have acted as a drainage channel for seven-eighths of the area it was supposed to drain. For the remaining eighth there was a sufficient water-way for such an unusually small rainfall through the old, though narrowed, culvert under the road. The obvious conclusion, therefore, is that the filling in of Chowdhry's Gurh offered no obstruction to the drainage in 1873, and consequently could not, as it is alleged, have been the cause of the fever.

11. This latter conclusion is also arrived at by a series of inquiries into the history of the fever itself. It ought to be observed that the evidence taken on this point was most reliable, being derived chiefly from official records and also from intelligent medical practitioners at Seebpore, one at least of whom was able to consult private notes on the subject. The first official notice of the outbreak of fever in Shibpore is to be found in Dr. Elliot's Sanitary Report for 1872, an extract from which is given in the Appendix; and we would remark that on this subject the evidence of the Native practitioners is also very clear. Fever of a severe and fatal type first made its appearance in August and September 1872 in the following quarters of Seebpore:—Sanaparah, Cazeeparah, Bhorparah, and Betaitollah. Although these quarters of Seebpore are situated on the borders of Chowdhryparah to the south, their drainage is in no way connected with the Chowdhry's Gurh, but is carried by a separate channel direct into the river. So severe was the fever in these places, that almost all the inhabitants suffered from it; and it is remembered as a curious fact that, with only a few exceptions, the residents were from sickness unable to attend a religious ceremony held by Baboo Ram Chunder Mookerjya.

12. As is usual with this fever, the disease abated in intensity during the hot weather months of 1873. In August 1873, however, it re-appeared at Jogiparah, a quarter which lies to the north-west of Chowdhryparah, and which, moreover, is in no way connected with its drainage system. From this point the fever appears to have spread in two directions—easterly towards Mookerjyaparah and Haldarparah, and westerly to Mussulmanparah and Pochchimparah. Towards the end of the year it became general, including, among other places, Chowdhryparah and the quarters adjoining the Gurh. The fever was of a very severe and fatal type, but it was said not to have been so fatal in Chowdhryparah as in other places. The Native gentlemen present, while not denying this statement, suggested that the lower death-rate was due to the better medical attendance which the well-to-do residents of this *parah* could command. Dr. Bird's remarks on the fever of 1873 will be found in the Appendix.

13. In 1874 fever of a modified and less severe type broke out at the same time and in the same places as in the previous year. There was also less mortality, the deaths occurring chiefly among those who had suffered from fever in 1873.

14. The general health of Seebpore, though not restored to its normal state, is now much better than it was in 1873 and the following years.

15. The inquiry into the history of the fever, therefore, proves that it first began, in 1872, in the neighbourhood of Chowdhryparah; that in 1873 it again showed itself on the borders of Chowdhryparah, in an opposite direction to the place first attacked in the previous year; that both these places were entirely unconnected with the drainage system of Chowdhry's Gurh; that it was only after the disease had become general that Chowdhryparah was attacked; that the mortality, influenced by whatever cause, was less in Chowdhryparah than elsewhere; and lastly, that the general health is now improved,

though Chowdhry's Gúrh remains filled up. Now, it has already been shown that in 1872 and 1873, the years of the fever, the rainfall was so deficient that Chowdhry's Gurh could not have acted as a drainage channel. The final conclusion, therefore, is that the fever was in no way influenced by its being filled up.

16. BALLY.—The inquiry at Bally was limited to an investigation of the statements made in the Memorandum regarding the obstructions offered to its proper drainage. The points particularly examined were (1) the direction of the drainage and its outfall; (2) the position of the metalled road which runs southward from the Railway, and its relation to the drainage system; (3) the tanks and gardens which are said to have been made in the surplus Railway land; (4) the construction of recent kutcha roads and the obstructions caused by them.

17. Before proceeding to consider the points referred to in detail, it is necessary to state here that Baboo Ram Chunder Mitter, who represented Rajah Degumber Mitter, and who was present during the whole of the local inquiry, submitted a sketch and memorandum for the information of the Committee. This sketch and memorandum are herewith attached for the purpose of showing how Rajah Degumber Mitter has been misled by his informants.

18. The accompanying map, showing the drainage of this portion of Bally, was the result of a recent survey of the town undertaken under the direction of Mr. Whitfield. In the memorandum attached to the map the whole question is carefully discussed. The Committee agree with the opinion expressed, viz. that there has been no obstruction, nor is it possible that there could be any.

19. At a local investigation the members of the Committee carefully followed the main drainage system, and during their progress made the necessary inquiries from the inhabitants residing in its proximity. The conclusion arrived at was, that not only does the drainage take the course shown by Mr. Whitfield's map, but that these drains have existed as long as the oldest inhabitants could remember. The drains, both large and small, were found clean and well kept, and culverts are provided wherever they are required. The last culvert in the series was, however, found broken, but the inhabitants on the spot stated that it did not cause any obstruction to the outfall. The Committee were also able to judge for themselves that this was the case, as the spring-tides had passed up the drains for a considerable distance, and had, within a short time, been thoroughly re-drained again into the Bally Khal. It is well to notice here that the drainage of the village up to the metalled road runs from east to west, and that the eastern ditch along that road then forms the principal drainage channel, and runs in a north-easterly direction till it discharges itself into the Bally Khal.

20. The Committee next followed the metalled road, referred to as running southward from the Railway-station. This road was formerly a kutcha road; it was metalled in 1873. On a reference to the map, it will be seen that the drainage being in the direction already indicated, this road cannot be said to cross the principal drainage channel of the village. There is only a narrow strip of land between the road and the Railway, with not more than two or three huts on it. For the rainfall of this area sufficient culvert space is allowed and proper drainage provided. The highest part of the metalled road being, moreover, below the surrounding land, the Committee fail to see what combination of circumstances could ever make it an obstruction.

21. It is asserted that the Railway surplus land has been converted into tanks and gardens. Only one such tank and garden could be found. This belongs to Baboo Kedar Nath Chatterjya, and is situated near the Railway-station. A reference to the plan will show that the direction of the drainage being away from the line of Railway, the tank and garden can offer no obstacle to it whatever; and this fact was corroborated by disinterested inhabitants, who stated that in very heavy rain some water used to find its way towards where the new tank is now, but that usually the drainage was in the opposite direction.

22. With regard to the statement that obstruction is caused by a number of recently-constructed kutcha roads, the Committee find that no new roads have been constructed for the last 10 or 15 years, nor was any one such road pointed out to them. The old kutcha roads, it is true, have been repaired, and consequently raised; but as they appear to be provided with proper drains and culverts, they cannot offer any obstacle to the drainage.

23. Every statement made regarding Bally having been found to be incorrect, it was considered unnecessary to make any inquiry into the prevalence of fever.

24. CONNAGORE.—At Connagore the inquiry was, as in the two previous instances, directed to the points especially referred to in the Memorandum—(*a*) the direction of the drainage outfall; (*b*) the roads without culverts which, by crossing the drainage channels, interfere with the drainage; (*c*) the silting up of drains and the encroachment on them by owners of adjoining land; (*d*) the obstructions to drainage caused by the construction of tanks and gardens along the Railway embankment; (*e*) the history of malarious fever in the village, and its connection with the obstructions referred to.

25. The natural outfall of the drainage lies in two opposite directions. The northern and smaller portion, comprising Pearabagan and Hateerkool, drain direct northwards into the Bagerkhal. The tidal water of this *khal* passes into those parts of the village which comprise the greater portion of it, and which drain southward along the Railway embankment over lowlying lands towards the Bally Khal. It is therefore worthy of notice that the outfall is not solely towards the Bally Khal, as has been stated. The importance of this point will be seen in the history of the fever further on.

26. Since the main roads of the village run parallel to the drainage channels, no serious obstructions can be caused, nor were any pointed out to the Committee; and we were told by a Municipal Commissioner, at present engaged in improving the drainage of Connagore, that, except in a few minor instances, no such obstruction existed.

27. As regards the silting up of drains, the Committee have no doubt that this occurred here as it does elsewhere. We have evidence, however, to show that measures were taken in 1875 to clean the drains, and that these measures are now being repeated. With reference to encroachments on the drains in the interior of the village, the two instances mentioned by the inhabitants occurred 10 to 20 years ago.

28. The Committee went very fully into the question of the obstructions offered to the drainage along the Railway surplus land, and they find that two gardens with tanks have existed for some years, and that one other has been constructed within the last eight months.

29. The Railway surplus lands were sold by Government in 1872, and in August 1873 Baboo Shib Chunder Deb, a resident Municipal Commissioner, represented that interference with the drainage had been commenced by the purchasers, who were then constructing the two tanks and gardens already referred to. With the representation was submitted a request that the Government would issue orders to prevent the owners from carrying on the work. It would appear that, since the land was sold unconditionally, the Government had no power over the purchasers, and no action could therefore be taken in the matter.

30. No further mention is made as to any interference with the drainage until 1875, when one of the garden proprietors constructed a bund across the side ditch near the Railway-station. It was, however, allowed by all the local witnesses that no actual obstruction took place, because an opening was made in the bund during the rains to allow the water to escape. But this was not done until the people had remonstrated. In 1876, however, the owner referred to refused to make a similar opening in the bund, and the consequence was that some obstruction did take place, causing the submersion of a part of the Ryland road, which has since been raised. This obstruction was brought to the notice of the Magistrate, but it was not till after the rains had ceased that the official orders for its removal were carried out. There is at the present time a sufficient opening in the bund to allow water to escape towards the Bally Khal.

31. The history of malarious fever in this village was chiefly obtained from the full annual reports submitted by Dr. Greene, the Civil Medical Officer of Serampore. It is therefore advisable in the first place to consider briefly Dr. Greene's views on the subject as they are stated by himself in his reports. He has, since 1871, looked upon defective drainage as the main cause of the fever; but he has also, in some years, referred to the poor condition of the people, the practice of steeping jute, &c., as causes which in a measure

influenced the fever outbreaks. In 1874, when the fever was rapidly dying out, he attributed it to the better drainage provided by the Dancoonee Canal and the opening of the Surusuttee Khal. The fever having increased in 1875 and 1876, he changed his opinion as regards the beneficial influence of the canal, and now regards it as one of the drainage obstructions to the country on account of its high banks. The importance of Dr. Greene's evidence lies, however, in the fact that although he has for a number of years held strong views on the subject, and has seen much fever in his district, he is unable to point to any one single instance in which obstruction to drainage was the sole cause of the fever; and he was obliged to admit that, as far as Connagore was concerned, the northern portion, which drains directly into the Bagerkhal and the villages that lie west of the Railway, and consequently drains without any obstruction inland, suffered just as much as the obstructed area draining southwards to the Bally Khal. Two statements made by Dr. Greene regarding obstructions caused by the Railway and canal have been objected to by individual members of the Committee. As regards the Railway, it is stated by one member that a careful inquiry has shown that it does not obstruct the drainage of the land lying between it and the river Hooghly. The other statement, which refers to the canal, can hardly be entertained when it is known that at every 500 feet an opening exists in the embankment to allow the surface drainage to pass into the canal.

32. Fever in an epidemic form was noticed in certain parts of the district around Serampore in 1871, the places specially mentioned being Buddiabatty, Singoor, and Kristonuggur. In the Sanitary Report for 1872 it is stated that fever of an epidemic type commenced in July in Connagore, Rishra, and Buddiabatty, and during the following months extended to Mohesh and Bullubpore. It was most severe along the banks of the Ganges, and is said to have affected 50 per cent. of the population.

33. In 1873 there was no fresh outbreak of fever, but traces of the previous year's fever were to be found in some places, and especially Kristonuggur. The report for 1874 records the dying out of the fever, and the improvement is chiefly attributed to the construction of the Dancoonee Canal and the bringing of the Damoodur water into the Surusuttee.

34. In 1875 fever of a malarious type was reported to have appeared in an epidemic form at Connagore, Bashye, Kanyepore, and Rishra. It commenced in September and continued to the end of the year, and the sickness being very considerable, it was found necessary to provide a charitable dispensary at Connagore for the treatment of the poorer classes. Among the causes mentioned by Dr. Greene are included the obstructions caused by the making of tanks and gardens along the Railway embankment, and it is asserted that water lay in stagnant pools along the line of Railway. It has already been shown that the bund which had been constructed by one of the proprietors had an opening in it for the passage of water towards the Bally Khal. We notice that the rainfall in this year was even less than in 1872.

35. In the Sanitary Report for 1876 it is stated that fever again prevailed at Connagore, while other parts of the district were healthy. The mortality was, however, only nominal. It may, however, be allowed from the evidence gathered that there was considerable sickness towards the end of 1876; but as the mortality was nominal, the disease must have been the ordinary malarious fever of the country. It was during the rains of this year that the bund alluded to offered an obstruction to some portion of the drainage of Connagore.

36. It should be added that the Member of our Committee best qualified to speak on this subject is of opinion that, although there may have been some obstruction caused by the bund, it is physically impossible, from the nature of the ground, that it could have been to any great extent.

37. At the request of the Magistrate of Hooghly we submit the following memorandum recorded by him:—

"It should be noticed, once for all, that complaints founded on the filling up of Railway side-cuttings are misleading on all sides. These cuttings are never intended to act as drains, and purchasers have an absolute right to fill them up as they like. It is not the filling of them up that causes any difficulties, but the fact that purchasers raise their ground *above the level of the fields*, which sometimes is going beyond their rights, thus causing obstruction in the surface flow

of water along the toe of the embankment to the nearest waterway under it, or at its end. The error here noticed is incessantly causing confusion. The complaints are often well founded, but are at once answered by exposing the fallacy of the argument used in support of them. The abundance of the waterway under the Railway has been over and over again demonstrated, and is now no longer denied. But, in order that these arches shall serve their purpose, it is generally essential that there should be no ramps or other obstructions running out from the embankments which do not leave free passage for water at the level of the natural surface all along the toe of the Railway embankment. In this instance we find no obstruction caused by the filling up of the cuttings; but we find that there was a bund made and land thrown up to some distance from the Railway which stood above level of the natural surface, and thus became an obstruction, till a cut was made which goes no deeper than the level of the rice-fields around."

38. In conclusion, we would mention that the district officers of Howrah and Hooghly, and the sub-divisional officers of Serampore, were present at our local meetings and took an active part in the inquiry. Our acknowledgments are due to the Municipalities of Howrah and Serampore for the cordial manner in which they have assisted us in this inquiry. The Committee are also indebted to Baboo Shib Chunder Deb of Connagore for much valuable information and assistance.

We have the honor to be,

SIR,

Your most obedient servants,

A. S. LETHBRIDGE, M.D., *President.*
J. WHITFIELD,
W. HERSCHEL *(with a note)*,
PEARI MOHUN MOOKERJEE,
AMRITA LAL MOZOOMDAR,
HEM CHUNDER KERR,
F. H. PELLEW, *Magistrate, Howrah,*
J. G. PILCHER, *Surgeon-Major, Civil Surgeon, Howrah,*
W. H. GREGG, *Surgeon, Hooghly,*
*Members.*

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I THINK it necessary to observe that the limitations which the Committee consider have been put upon the scope of their inquiry under the instructions of Government (*vide* letter No. 1628, dated the 29th May last) preclude them bringing Rajah Degumber Mitter's theory, that subsoil humidity occasioned by obstructed drainage is the cause of the epidemic fever, to a satisfactory test. The Committee have simply inquired into the instances mentioned in the Rajah's memorandum; but this memorandum does not give all the facts which could be collected on local inquiry. Be that as it might, I should mention that in course of our inquiry persons came forward to give evidence that want of drainage or imperfect drainage was connected with the outbreak of fever in portions of the three villages inspected by the Committee; but, as the President remarked in one of the meetings, the scope of the Committee's inquiry being restricted, they could not take cognizance of facts or cases not included in the Rajah's memorandum. Such being the case, I for one would wish it to be understood that this report of the Committee should not be accepted as a conclusive solution of the question.

PEARI MOHUN MOOKERJEE.

*The 4th July* 1877.

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NOTE.

I ATTACH importance to the fact established by the evidence of Dr. Greene and of the Joint-Magistrate, that the obstruction caused by the tank (or bund) and garden at the Railway-station was serious. It headed the drainage back for three consecutive weeks into the heart of the village. We are bound, I think, to notice the excessive soaking thus caused, and the coincidence thereof with the outbreak of 1876, even although the negative character of the rest of the evidence prohibits our attributing the one to the other as effect to cause.

W. HERSCHEL.

*The 6th July* 1877.

## APPENDIX.

*Memorandum on the Drainage of* SEEBPORE, *by* J. WHITFIELD, ESQ., C.E., *Executive Engineer, Northern Drainage and Embankment Division, dated the 30th June* 1877.

THE area draining through Chowdryghur contains 707½ beeghas, or a little over one-third of a square mile, and is shown on the accompanying plan by a shaded blue dotted line. The figures on the plan show the relative heights of the ground and channels, and the direction in which the water flows is shown by arrows. On referring to the level figures it will be seen that the ground varies in height about 6 feet, the highest ground being on the south and east side and forms a water-shed line in that direction. On the west and north sides the ground is somewhat irregular, but all drainage towards Chowdryghur is cut off by spoil earth from tank excavations, houses, and the unevenness in the natural ground level; and from the boundary line shown on the plan, the drainage finds its outlet in the direction away from Chowdryghur.

2. The tanks are in the first instance receptacles for all the rain that falls, and, as shown on the plan, they generally overflow from one to another, and, when quite full, spill over the surface of the ground and by the nearest outlet (if there be any) flow into Chowdryghur; otherwise the overflow water takes the lowest ground and thus finds its way into Chowdryghur. At A the water from the southern portion of the ground, draining into Chowdryghur, falls first into the side ditch of the road, the bed of which is 37·38 at that point; it then runs north along the north side of the road, the level of the ditch being 37·25, 37·49; and at the commencement of what was Chowdryghur at B the bed of the ditch is 37·69. At the point B the water of the remainder of the southern part of the basin reaches the Chowdryghur, the level of the bed of the ditch at its discharge into the ghur being 37·69.

3. The water from the remaining portion of the drainage basin joins Chowdryghur from the north at D, at a level of 36·50. This point is the outlet of Chowdryghur, and the outlet of the whole basin. Alongside, and parallel with the road and road-ditch, is a depression in the ground about a foot below the level of the ditch, and about the same level as the final outlet culvert at D.

4. Now, tracing back the levels from this final outlet at D, where the bed of the ditch and the bed of the outlet culvert are the same, viz. 36·23, there is a continuous rise over the filled up site of Chowdryghur, except very trifling irregularities; but in no case are the depressions below the outlet ditch and culvert, as shown by the section A, C, B, D.

5. Between B and D, along the site of Chowdryghur, which was filled up between April and June 1873, there is a continuous, although not uniform, fall of 1·46 feet in a distance of 350 feet. It is therefore physically impossible that the filling up of the Chowdryghur can have caused any obstruction to the drainage.

6. The level heights fully confirm the conclusions of the Committee in that respect, on their inspecting the locality.

7. The overflowing of the tanks from one to another in the zigzag and circuitous manner shown on the plan must, when that takes place, inundate a very large proportion of the whole area; but it is clear that Chowdryghur is in no way answerable for this. The same thing is a common feature in most of the villages; and if some measures could be introduced to prevent this, there can be little doubt but that it would greatly improve the sanitary condition as well as the comfort of the inhabitants.

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*Memorandum on the Drainage of* BALLY, *by* J. WHITFIELD, ESQ., C.E., *Executive Engineer, Northern Drainage and Embankment Division, dated the 30th June* 1877.

THE accompanying plan shows the roads which are alleged to have obstructed the drainage, and which the Committee inspected and was satisfied that they did not cause any obstruction, and that the drainage, instead of flowing

inland towards the bheels in the direction of the general natural fall of the surface of the ground, is intercepted by deep ditches alongside the roads, and by them conveyed into Bally Khal at A.

2. On either side of the road B C there is a ditch 2-6 below the level of the road and 5 to 6 feet below the level of the ground. At C is a culvert under the road giving a passage for the water from the south side into the drain or khal leading into the Bally Khal at A.

3. There is a continuous, though not quite uniform, fall in this drain, as shown by the red figures from B to A. The distance is about 1,600 feet, and the fall from B to A is 5 feet, so there cannot be any doubt about the sufficiency of incline to insure a rapid outflow.

4. The road extending from the Railway-station southwards, parallel to the Railway line between the Railway and the village, which was alleged to have seriously interfered with the drainage, is shown on the plan at B D. This road is metalled about half this distance and, like the other road, is provided with deep ditches on either side, with culverts under the road connecting the ditches; culverts also connect the ditches on either side of the unmetalled portion. The beds of the side ditches are about 3 feet below the surface of the road and 4 to 6 feet below the level of the ground on either side, so that if there were no ditches the road itself would form a drainage channel instead of an obstruction, being, as is shown by the level heights, from 1½ to 3 feet below the level of the ground on either side.

5. The same may be said of the road C E F, except that the metalled part of the road is on the same level as the ground instead of being below. It does not, however, offer any obstruction, and the water which overflows it, if any, is carried off by the side ditch. From E to F the road is unmetalled, and its surface is below the level of the ground on each side. At E the water is carried through the drain and flows into the B D road-ditch at G. At H the drainage separates and flows east and west, as shown on the plan. At K and L the roads pass under the Railway, and to obtain greater headway at K the surface of the ground has been lowered; but as it is only about 6 inches below the level of the ditch at the side of the road leading to it, there cannot be any important accumulation, and being a slight depression of 6 inches it does not in any way offer obstruction to drainage.

6. The tank at the station is isolated, and does not stand in the way of any drainage. When full, if ever that happens, the overflow will fall into the drain adjoining.

7. The spring-tides in the rains sometimes rise as high as 17 feet, and when that occurs all the ditches are filled, and the roads and ground below that level covered with water, but it all readily flows out again. The Committee noticed the mark of the spring-tide which had flowed in a few days before the inspection, but no water was left behind.

8. From the levels shown on the accompanying plan and the personal observation of the Committee, the conclusions of which the levels confirm, there are no grounds to show that the roads referred to have been obstructions to drainage, but, on the contrary, they establish the fact that, as far as the roads are concerned, there has not been any obstruction.

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*Extract from the Sanitary Report of Howrah for* 1872.

"Endemic, intermittent, and remittent fever of a congestive type was unusually prevalent in certain portions of the district at the drying up of the rains and during the early part of the cold season. The villages in which I have personally seen the disease are Sheebpore, Shonaparah, Moolaparah, Kamarparah, Khoorool, and others contiguous to the station and town of Howrah."

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*Extract from the Sanitary Report of Howrah for* 1873.

"Fever has prevailed in the district throughout the year, but with greatest intensity during the second half of it. It was present with special force and fatality during October, November, and December, in the Sheebpore and Belgatchia villages, within the limits of the municipality."

The village *Bally* is situated on the west bank of the River Hooghly and about five miles from Calcutta. The natural drainage of the village, following its slope, used to flow from east to west, that is, in a direction away from the river-bank, and ultimately came back to it through the "Bally Khal," which extends along its north-west side. The East Indian Railway line, which passes along the west of the village, that is, across the direction of its slope, did not materially interfere with its drainage, as part of the monsoon water used to flow into the khal along the east side of the line, and the rest, which used to fall into the khal along its west side, easily found its way there by means of culverts existing in the line. But a road which extends from the railway station southwards, parallel to the railway line and between it and the village, has very seriously interfered with its drainage. This road was kutcha, or unmetalled, before, and the rush of the monsoon water in seeking its natural outlet had made several breaches in it, through which it used to make its way to its natural outfall. But about three years ago the road was metalled and the breaches filled up without substituting culverts for them. Besides this, the surplus lowlands on either side of the line have now been sold, and their present owners have converted them into tanks and gardens—thus obstructing the passage of the village drainage through them into the khal.

Besides the above road, there are a number of kutcha roads (all constructed recently) in the interior of the village, which have more or less offered obstructions to the flow of the monsoon water into its natural outfall.

The village drainage having been obstructed in its natural course in the manner described above, an attempt has been made, probably by the Municipality, to direct the same towards the east, that is, in a direction opposite to its water-level, so as to make it fall into the khal near its mouth; but it has proved ineffectual, as the level of the village near this outfall is several feet higher than that near the railway line; so that, instead of draining the village water, the river water at times of high flood enters the village through it.

If, instead of the fruitless effort to divert the natural course of the water towards the east, a deep drain be cut by the side of the Railway line, having a proper slope towards the khal, and all the big drains of the village be joined to it by means of culverts in the road above alluded to, and if also the cross roads in the interior of the village be provided with culverts, the original drainage of the village would then be restored, and thereby prevent the recurrence of the epidemic, which, be it observed, broke out immediately after these obstructions to the drainage were offered.

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Circular No. 28, dated Calcutta, the 7th August 1877.

From—A. MACKENZIE, Esq., Officiating Secretary to the Government of Bengal,
To—All Commissioners.

I AM directed to request that you will call the special attention of the District Officers and Municipal Commissioners of your division to the provisions of Act VI (B.C.) of 1873, so far as these furnish a means of improving the drainage of town and village sites.

2. It is a recognized fact that much unhealthiness is caused by obstructed drainage and consequent dampness of the sub-soil; and although the Lieutenant-Governor is not prepared to undertake the impossible task of draining at the expense of the State all the unhealthy districts of Bengal, he believes that very much may be done in the way of improvement by well-directed local effort, and without any very great expense.

3. Within the limits of regularly constituted municipalities, it is in the power of the Commissioners to effect improvements and remove obstructions, so far as their funds will allow and the provisions of the Municipal Act permit, and they have also very extensive power of coercing private owners. They should be stirred up wherever necessary, and called upon to devote special attention to this branch of their town conservancy.

4. But there may be cases even in towns to which the Municipal Act will not apply, and in which it is not proper that the cost of improvements should fall upon the rate-payers. There are also numerous villages outside municipal limits possibly suffering from the effects of obstructed drainage, and

the health of a municipality may be affected by evils lying beyond its own jurisdiction. In such cases the provisions of the Embankment Act furnish a ready remedy.

5. By that Act a water-course is defined to include a line of drainage, weir, culvert, pipe, or other channel for the passage of water, whether natural or artificial. Under section 4 the Collector has power to cause to be removed or altered "any obstruction of any kind which interferes with the general drainage of any tract of land." He may construct any water-course, or effect any alteration in any public water-course, when this is required for the improvement of the health of any village. He may call upon the person in charge of any road which interferes with the drainage of any tract of land to alter such road, or to construct any water-course under or through such road; and if the person so called upon fails to obey the order, the Collector may carry out the work at his expense, so far at least as it was necessitated on account of insufficient provision having been made at the time of constructing the road for the natural drainage then existing.

6. The Act gives the Collector ample powers for carrying out any works of the above description, and for assessing the cost, where individuals are not liable, upon the estates and tenures benefitted thereby.

7. There is nothing to prevent a municipality, or any other public body or individual, from moving the Collector to take action under the Act; and the Collector has always at his disposal the professional services and advice of the officers of the Public Works Department.

8. The Lieutenant-Governor, as he has already said, believes that it is by judicious local action that the evils referred to in paragraph 2 of this letter will most effectually be met; and he desires to call the special attention of all Commissioners, District Officers, and Municipalities to the remedies that already lie open to their hand.

9. At the same time, it must always be remembered that much harm may be done to individual interests, and much waste of public money may be caused, by hasty and ill-considered action. In every case there must be careful and intelligent enquiry as a preliminary to remedial measures, and there should be a reasonable certainty of positive good as their result. The provisions of the Board's circular order No. 3 of May 1875 will also have to be borne in mind by Collectors.

## RESOLUTION ON THE REPORT OF THE HEALTH OFFICER OF THE PORT OF CALCUTTA FOR 1876.

GENERAL DEPARTMENT.—MARINE.—No. 3169.

*Calcutta, the 31st July* 1877.

READ—

A letter from the Sanitary Commissioner for Bengal, dated 30th May 1877, forwarding the Report of the Health Officer of the Port of Calcutta for the year 1876.

THE reasons for the appointment of a Health Officer for the Port of Calcutta were noticed at some length in the Resolution on last year's report. Quarantine rules, which are rigorously enforced in the chief ports of Europe, have not been introduced here. Simple inspection by the Health Officer, and the adoption by the masters of vessels of such hygienic measures as he may prescribe, stand in the place of the quarantine regulations, which frequently impose a heavy burden on commerce in European ports. It is believed that the mercantile community of Calcutta fully appreciate the necessity for the appointment of a Health Officer of the port, and understand that, in view of the increasing number of ships visiting Calcutta, and the more rapid communication with Europe by the Suez Canal, the only alternative to the present system would be the introduction of regular quarantine.

2. Besides inspecting the shipping, it is the duty of the Health Officer to exercise a close supervision over the local sanitation of the river and its banks, and to propose such measures as may be necessary to discover the causes and check the progress of any outbreak of disease among the vessels lying in the port. For these various purposes he is provided with an adequate

establishment and a steam-launch, the cost of which is debited to the Hospital Port Dues Fund. The condition of this fund has recently been under the consideration of the Lieutenant-Governor, and a corrected statement of the receipt and expenditure for 1876 is awaited from the Accountant-General. The fund is in a thoroughly solvent and prosperous state, and there will be no occasion at present to raise the tonnage dues now levied under sections 59 and 60 of Act XII of 1875.

3. On the 23rd April 1876 Dr. French, the first Health Officer appointed, was relieved by Dr. J. G. Pilcher, who continued in office till the 10th February 1877. Dr. S. C. Mackenzie was then appointed to officiate, and the report for 1876 has been written by him with the assistance of some notes furnished by Dr. Pilcher. It is much to be regretted that Dr. Pilcher, who actually held the appointment for nearly a whole year, should have been unable to find leisure to record the results of his own work, and it is clearly from this cause that the present report, though dealing with an entire year, is far less complete and exhaustive than that furnished by Dr. French for the last four months of 1875.

4. In the resolution upon the last report it was observed that the record of the distribution of cholera among the vessels lying in the port had not been extended over a sufficiently long period to form the basis of any trustworthy conclusions. During 1876, 110 Europeans attacked with cholera were admittted into the General, Howrah, and Medical College Hospitals, of whom 53, or 48·20 per cent., died. In 91 cases at the General Hospital and in 10 at the Howrah Hospital notes were taken of the part of the river from which they had come, and it was found that, out of the 101 cases thus observed, 55, or 54·46, were traced to vessels lying below Fort Point. It is probable, indeed, that the nine cases taken to the Medical College Hospital were all from vessels moored higher up the river, and this to a certain extent reduces the proportion of sickness below Fort Point, while the figures in any case only relate to a single year. But even with these deductions it still appears that, although far less than half of the shipping in the port is moored below Fort Point, fully half of the cholera cases of the year occurred in that part of the port. It is hard to resist the conclusion that this is mainly due to the fact that ships moored below Fort Point lie between two sources of sewage discharge—the Fort drain and Tolly's Nullah.

5. The long-pending question of the disposal of the sewage of the Fort has been recently considered by a Special Committee, and it has been decided to connect the Fort drains with the main municipal sewer, and to discontinue the practice of discharging sewage into the river. This, it is believed, will remove one of the permanent causes of cholera in the port, and the Lieutenant-Governor regards the conclusion arrived at by the Committee as furnishing a most satisfactory solution of a difficult and complicated question. The south bank of Tolly's Nullah, on the other hand, appears from the reports both of the Sanitary Commissioner and the Health Officer of Calcutta to be still in an extremely foul condition. Several latrines discharge their contents directly into the nullah, the water is largely contaminated by stable refuse, and the banks are continually defiled by the inhabitants of the neighbouring huts. All the sewage that thus finds its way into Tolly's Nullah passes out into the Hooghly with the ebb-tide, and is either taken up again by the flood or deposited on the sloping foreshore on either side of Hastings Bridge to generate noxious exhalations at the next low-tide. The Lieutenant-Governor is constrained to observe that the action of the Suburban Municipality in respect of the sanitation of Tolly's Nullah has displayed a great want of energy and persistence, which contrasts most unfavourably with the efforts of the Municipal Commissioners of Calcutta to improve the health of Hastings by extending their main sewer along the north bank. The Presidency Commissioner will be requested now strenuously to urge the Suburban Commissioners to do their duty in this matter. He must not rest content with reports and explanations, but must see that effective steps are taken to remedy the evil without delay.

6. Besides the 110 cases of cholera noted above, the list of the principal diseases of the year includes 285 cases of dysentery, 244 of malarious fever, 29 of scurvy, and 133 of contagious diseases. From inquiries which were made by Dr. Mackenzie in the General Hospital, there seems to be reason to believe

that the latter class of diseases are for the most part contracted in Europe and not in Calcutta.

7. One of the most important functions of the Health Officer is to board ships on their arrival in port, and to inquire into the causes of all cases of scurvy that are found among the seamen. If it be scientifically true that scurvy is a disease which can be prevented with absolute certainty by the maintenance of a proper diet while at sea, it would appear that the existence of a single case of scurvy on board a vessel arriving in port is of itself strong *primâ facie* evidence that the owners or master have neglected some established and obvious precaution. In this view, the observations of the Health Officer should have a peculiar value as a systematic record of the predisposing causes of the disease. Unfortunately, however, Dr. Pilcher has omitted to furnish any detailed account of the 29 cases of scurvy which occurred within the year. There is reason to believe that scurvy has not diminished as much as is popularly supposed, and one of the chief duties of the Health Officer should be to investigate the subject carefully and persistently. The Lieutenant-Governor is advised that there is some doubt as to the correctness of Dr. Pilcher's theory that scurvy in many cases is caused not by specific neglect of recognized safeguards, but by the fact that by repeated voyages a seaman's constitution has become thoroughly saturated with the disease. No doubt the pressing demand for seamen in England leads in many instances to the shipping of men in an enfeebled state of health, but this circumstance would appear to create an additional obligation on the part of ship-owners to provide every safeguard that can be devised against an outbreak of scurvy among the men.

8. The extreme diversity of practice which prevails on British ships in the matter of provisions is probably a chief cause of scurvy. It is true that under the Merchant Shipping Act of 1854 the agreements entered into with the crew must define the scale of provisions on which they are to be fed, but no scale has been authoritatively prescribed by law, and it is notorious that in such matters sailors are quite incompetent to look after their own interests. In fact, what happens is this: sailors sign agreements thoughtlessly, and then find, when at sea, that they have no claim as of right to anything beyond absolute necessaries, while for fresh meat, soup, preserved vegetables, and other luxuries which act as preventives of scurvy, they are practically dependent upon the liberality of the master of the vessel. On arrival of a vessel in Calcutta with scurvy on board, the Health Officer points out to the master that tinned provisions should have been issued more fully, and the master appeals to the agreement and points out that the crew have actually had more than they were legally entitled to.

9. The report states that the quality of the lime-juice supplied to British ships was nearly uniform, although the citric acid, which is its essential element, was sometimes deficient. From several cases of scurvy reported in the present year, there is reason to believe that the lime-juice supplied to British ships, even when purchased from recognized warehouses, is frequently very deficient in citric acid, and that this deficiency is often the immediate cause of scurvy. The English Acts provide for the lime-juice containing a certain proportion of proof spirit, but the proportion of citric acid has never been laid down by law, although it is understood that eminent hygienic authorities consider 30 grains of citric acid to each ounce of lime-juice to be the minimum that is required. A further difficulty arises in the case of tinned provisions from the fact that the outside of the tin affords no evidence of the date at which the contents were sealed up. Measures will be taken to bring to the notice of the Board of Trade these defects, and in the meantime the Lieutenant-Governor hopes that the Health Officer will spare no pains to place the Government in possession of all facts bearing upon the subject, and exercise his influence discreetly to induce masters starting from this port to take on board a full supply of preventives against a disease which, it is believed, should long ago have disappeared altogether from British merchant shipping.

10. The Lieutenant-Governor has observed with pleasure the increasing use of filtered municipal water by the shipping in the port. It is understood that under existing arrangements water is supplied by the Municipal Commissioners to the shipping at a fixed charge of Rs. 8 per 1,000 gallons. When

vessels are near enough to the shore to admit of hose being carried on board, the supply is given direct from the hydrants, and in all other cases the water is taken alongside the ship in iron tanks placed in large country boats, and is pumped up into the reservoirs on board. It is satisfactory to find that in 1876, 949 vessels, with crews aggregating 18,980 men, used municipal water, as against 247, with crews of 4,940 in the preceding year. The average quantity of water taken per head is shown to have been 359 gallons, but it should be noticed that in the case of steamers the water-supply is not regulated entirely by the requirements of the crew, as water is also used for filling boilers on leaving port.

11. With regard to the relations of the Health Officer with the masters of the vessels which he is required to board and inspect, there have been reasons for thinking in one or two cases that the function of the Health Officer was imperfectly understood by the masters of foreign vessels. Orders have since been issued to the Master-Attendant and the pilots to make it generally known that the Health Officer is acting under the special orders of Government; and the Lieutenant-Governor feels sure that Dr. Mackenzie will perform his duties of visiting and inspection in a conciliatory manner, so as to give as little trouble as possible to the commanders of vessels arriving in and leaving the port, and that he will as a rule find commanders ready to co-operate with him in measures which he may consider necessary for the health of the seamen.

By order of the Lieutenant-Governor of Bengal,

A. MACKENZIE,

*Offg. Secy. to the Govt. of Bengal.*

## RESOLUTION ON THE REPORT ON THE MEDICAL INSTITUTIONS OF CALCUTTA AND ITS SUBURBS FOR THE YEAR 1876.

MEDICAL.

*Calcutta the 7th August* 1877.

**READ—**

Report on the Calcutta Medical Institutions for 1876.

**Read—**

The Reports for 1874 and 1875 and the Resolutions recorded upon them.

THE returns for the past year show a slight falling off in the number of patients treated at the different medical institutions of the town and suburbs. The number, however, is still so much greater than that attained in any year before 1875, that it is manifest that the popularity of these institutions is still unimpaired. The following table shows the extent to which the public resorted to the different hospitals and dispensaries during the past three years :—

| | 1874. | | | 1875. | | | 1876. | | |
|---|---|---|---|---|---|---|---|---|---|
| | In-door. | Out-door. | Total. | In-door. | Out-door. | Total. | In-door. | Out-door. | Total. |
| 1. Medical College Hospital. | 4,849 | 45,199 | 49,548 | 4,456 | 45,374 | 49,830 | 4,559 | 44,670 | 49,081 |
| 2. General Hospital ... | 2,826 | 1,107 | 3,933 | 3,234 | 9,544 | 12,778 | 3,999 | 16,993 | 20,992 |
| 3. Mayo and Chandney Hospitals and Dispensaries. | 1,004 | 155,611 | 156,615 | 2,006 | 191,759 | 193,765 | 2,029 | 187,661 | 189,690 |
| 4. Campbell Hospital | 7,558 | ..... | 7,558 | 7,782 | ..... | 7,782 | 6,640 | ..... | 6,640 |
| 5. Municipal Police Hospital. | 2,841 | ..... | 2,841 | 2,880 | ..... | 2,880 | 2,261 | ..... | 2,261 |
| Total Calcutta Hospitals ... | 19,076 | 201,917 | 219,995 | 20,358 | 246,677 | 267,035 | 19,381 | 248,633 | 267,914 |
| 6. North Suburban Hospital. | 711 | ..... | 711 | 625 | ..... | 625 | 635 | ..... | 635 |
| 7. Sambhoo Nath Pandit Dispensary. | ..... | 9,608 | 9,608 | ..... | 9,907 | 9,907 | ..... | 6,475 | 6,475 |
| 8. Alipore Dispensary ... | 130 | 6,799 | 6,929 | 119 | 5,968 | 6,087 | 110 | 4,495 | 4,605 |
| 9. Arratoon Apcar Dispensary. | ..... | 8,858 | 8,858 | ..... | 9,539 | 9,539 | ..... | 9,559 | 9,559 |
| 10. Howrah General Hospital. | 2,002 | 15,631 | 17,633 | 2,345 | 18,094 | 20,939 | 2,340 | 18,488 | 20,828 |
| Total Suburban Hospitals... | 2,843 | 40,189 | 43,032 | 2,989 | 43,438 | 46,497 | 3,085 | 39,017 | 42,102 |
| Grand Total ... | 20,921 | 242,106 | 262,027 | 23,347 | 290,115 | 313,462 | 22,366 | 287,650 | 310,016 |

The increase in the number of out-door patients at the General Hospital corresponds generally with the decrease at the neighbouring suburban institutions—the Alipore and Sumbhoo Nath Pundit Dispensaries. It has recently been brought to the Lieutenant-Governor's notice that a class of patients now receives out-door medical attendance at the General Hospital which it was never intended should be treated at that institution. This class was formerly relieved at the two suburban dispensaries first mentioned. The extension of the out-door department at the General Hospital, beyond what was originally contemplated, has led to a great increase in the consumption of expensive European medicines, and has attracted a number of patients from institutions which are willing and able to provide for them. The question is still under the consideration of Government. The fluctuations in the attendance at the other institutions do not call for particular notice.

2. The statement showing the race and sex of all the persons treated has in this report been submitted for the first time in a complete form, the registration of all out-door patients at the General Hospital having been properly attended to:—

| Race. | Males. | Females. | Children. | Total. |
|---|---|---|---|---|
| Europeans ... ... | 6,415 | 1,414 | 1,351 | 9,180 |
| Eurasians ... ... | 11,044 | 7,741 | 15,343 | 34,128 |
| Mahomedans ... ... | 60,112 | 14,252 | 28,345 | 102,709 |
| Hindoos ... ... | 106,168 | 22,750 | 23,914 | 152,832 |
| Other castes ... ... | 3,465 | 2,919 | 4,783 | 11,167 |
| Total ... | 187,204 | 49,076 | 73,736 | 310,016 |

It appears from this statement that 60·38 per cent. of the total number treated were males, 15·83 per cent. females, and 23·78 per cent. children. The low proportion of females to males among Hindoo and Mahomedan patients is explained by the relative smallness of the female population which the census returns brought to light, and of course to a large extent by the social customs of these races. It is no doubt less agreeable to the women of all classes and sects to seek relief at a public dispensary than it is to men.

3. The appended table shows the health of the town and suburbs during the past nine years, as exhibited in the hospital returns:—

| Years. | All Diseases. | | | Cholera. | | | Death-rate, excluding cholera. | Number of deaths registered by the municipality. | Rate per mille of population. |
|---|---|---|---|---|---|---|---|---|---|
| | Treated. | Died. | Died per mille. | Treated. | Died. | Died per mille. | | | |
| 1868 ... | 16,998 | 3,386 | 199 | 1,324 | 503 | 461 | 179 | 18,786 | 32 |
| 1869 ... | 18,035 | 3,043 | 169 | 1,144 | 558 | 487 | 147 | 12,785 | 29·8 |
| 1870 ... | 15,816 | 2,250 | 142 | 605 | 258 | 426 | 131 | 10,402 | 24·4 |
| 1871 ... | 17,325 | 2,288 | 132 | 265 | 112 | 430 | 127 | 10,299 | 24 |
| 18 2 ... | 20,805 | 2,781 | 133 | 448 | 217 | 484 | 125 | 11,923 | 27·8 |
| 1873 ... | 16,896 | 2,706 | 148 | 493 | 264 | 536 | 132 | 11,558 | 26·9 |
| 1874 ... | 20,381 | 3,197 | 157 | 686 | 339 | 509 | 145 | 12,641 | 29·4 |
| 1875 ... | 22,806 | 3,815 | 167 | 787 | 405 | 516 | 154 | 15,069 | 35 |
| 1876 ... | *21,832 | 3,226 | 147 | 740 | 599 | 539 | 134 | 12,964 | 30 2 |

* Excluding 534 patients in the Eye Infirmary.

The death-rate per thousand among those treated was 147, including cholera cases, and 134, excluding them. From this table, it may be gathered that the public health was exceptionally good in the years 1870-1871, in respect both of the amount of sickness and of the virulence of disease, and especially of cholera; and that disease was more successfully treated in the hospitals during the past year than in either of its immediate predecessors. Dr. Beatson points to the introduction of the filtered water-supply, and of the improved system of drainage in 1869-1870, as the causes of the decrease in disease observable at that time. The cessation of the night-supply of filtered water in April 1872 probably accounts for some of the increase which has since occurred.

4. There were 136 cases of cholera in the shipping in 1876, against 110 in 1875. Dr. Beatson does not support the theory that the prevalence of this disease on the river-side is principally attributable to the discharge of Fort sewage into the river, and to emanations from the unembanked foreshore. It is remarkable, however, that Prinsep's Ghât and the Esplanade, the moorings in which these causes operate, if they operate at all, still supply the largest number of cases. Indeed, of 108 cases during the past year, of which the locality was specified, no

less than 71 came from these moorings and from Fort Point. However this may be, Mr. Eden considers it of the highest importance that the river should not be the receptacle of the Fort sewage. A Committee met during the past cold season to discuss the means by which the Fort drains can be connected with the municipal sewers. The scheme submitted has met with Mr. Eden's approval, and he has asked the Government of India to have this important work carried out as soon as possible.

5. The statement of the principal diseases from which in-door patients suffered shows some increase in enteric fever. The disease, however, appears to have been of a comparatively mild type. One-half of the sufferers treated were Europeans, and 14 out of the 22 native patients were constables. No less than 11 of these 14 cases ended fatally. It does not, however, appear that this result is due to specially defective sanitary arrangements in the police hospital or the thanas. In all, 669 important surgical operations were performed, with only 74 deaths. The operations on the eye were especially successful, only one out of 223 ending fatally. Mr. Eden is glad to learn that out of 40 deaths which followed operations at the Medical College Hospital, only two can be attributed to hospitalism. This is a great improvement on previous years, when this affection was so prevalent as to suggest a radical defect in the construction of the hospital building. It only shows how wrong it is hastily to condemn the construction of a hospital by the results of a single year.

6. The total amount disbursed on account of these institutions during the year was Rs. 5,07,473, against Rs. 4,88,835 in 1875. Of this increase, the General Hospital is responsible for Rs. 33,223. A part of this sum is represented by Rs. 18,768 for medicines and books supplied by Government. There was no corresponding entry in the accounts for 1875, and the circumstances under which this heavy charge has been incurred have not been explained. It is doubtless to some extent attributable to the undue extension of the out-door department, to which allusion has already been made. But the Lieutenant-Governor sees too much reason to believe that there is a great deal of waste and pilfering of expensive drugs in all Government hospitals and institutions. There is also an unexplained increase of Rs. 9,598 in the charges for dieting the sick, and of Rs. 3,427 under the head "Miscellaneous." In the accounts of the Mayo Hospital, as in those of the General Hospital, a charge for medicines and books supplied by Government appears for the first time. The expenditure under this head was Rs. 6,000. There is also an entry of Rs. 4,013 for dieting the sick, to which nothing in the statement for the previous year corresponds. Altogether, the charges of this hospital for 1876 amounted to Rs. 59,175, exceeding those for 1875 by Rs. 8,414. In view of the circumstance that there was a falling off of 4,075 in the number of persons treated, the Lieutenant-Governor cannot but consider this increase in expenditure unsatisfactory. In the report for 1874, the Surgeon-General estimated the permanent annual expenditure, exclusive of repairs, at Rs. 48,000. That this estimate was not unduly low was shown by the results of 1875, when, excluding expenditure on repairs, the gross disbursements were only Rs. 47,349. After deducting the charge on account of repairs, however, the expenditure for the past year is found to have been Rs. 6,861 over the estimate of 1874. The Campbell Hospital shows a decrease in the gross charges from Rs. 78,793 to Rs. 75,241. The number of persons treated, all in-door patients, was 6,640, against 7,782 in the previous year. Although the number of patients was so much smaller, there was actually an increase in the amount expended on bazar medicines, and on wine and spirits, and a large increase in the wages of servants; while the decrease in the cost of dieting the sick does not at all correspond with the falling off in the number of patients. The Lieutenant-Governor has recently found it necessary to appoint a committee to report on the expenditure of this hospital. The Sumbhoo Nath Pundit Dispensary, which has been deprived of many patients by the General Hospital, is the only institution which shows money invested during the year out of surplus income. The financial management of the Howrah Hospital has been successful. Though there was an increase in the number of sick, the charges for dieting, for medical comforts, and for "miscellaneous charges" show a decrease; while the increase in the gross expenditure is due to expenditure on repairs. This hospital receives no medicines free from Government; yet its expenditure is well within its income. Mr. Eden has very strong

grounds for believing that the expenditure on European medicines and medical comforts in most of the Calcutta hospitals is excessive, and that charges are thrown upon Government which, by careful management and a proper control of issues, might be avoided.

7. The Lieutenant-Governor cordially endorses the encomium passed by Dr. Beatson upon the ladies of the Nurses' Committee, and the lady nurses of the Canning Home. Careful and gentle nursing is often of more importance than expensive medicines, and the ladies who devote their time to the support and superintendence of this good work deserve the gratitude of Government and of the public.

8. *Medical College Hospital*.—Of the 3,818 in-door patients treated in this hospital, 1,795 were Christians and 2,023 were natives. The death-rate was 13·61 per cent.—7·18 for Christians and 19·32 for natives; excluding moribund cases, however, the mortality was only 10·35 per cent. of the total number treated. The death-rate among Christians was higher than in any of the preceding five years. The maximum death-rate of that period was 6·18 in 1872. The very satisfactory decrease in hospitalism has already been noticed. Deaths from this cause were only 5 per cent. of the number operated on in 1876, against 25·80 per cent. in 1875 and 31·06 per cent. the average of the six preceding years. The hospital authorities have not offered any explanation of this remarkable circumstance; but Mr. Eden understands that it is partly due to a new method of treating surgical cases. The Lieutenant-Governor wishes to have a special report on the out-door dispensaries at this hospital. The gradual falling off in the attendance, which has been noticed for some years, is apparently attributable in some measure to the want of accommodation. There has been a satisfactory increase in the number of minor surgical operations performed, as well as in the attendance at the ophthalmic dispensary. The question of enlarging the Medical College Hospital, so as to provide separate accommodation for surgical and obstetric cases, has long engaged the attention of Government, and Mr. Eden hopes that the work will be begun during the current year.

9. *General Hospital*.—The in-door patients admitted during the year numbered 3,805, including 409 natives. The death-rate of the Christians was 4·48, and that of the natives 13·96 per cent. Nearly one-third of the deaths among the former class resulted from cholera, 51 out of 101 cases treated ending fatally. It appears that 15 of these persons were moribund when they reached hospital. No less than 91 of these cases came from the shipping, and Dr. Elliot remarks on the difficulty of treating successfully patients who are frequently suffering from the depressing effects of previous intemperance or exposure. Another circumstance which militates against the successful treatment of these cases is the delay which generally occurs in sending the sufferer to hospital. The Lieutenant-Governor has now arranged for doolies, with relays of bearers, to be constantly in attendance at selected points on the river bank, for the prompt removal of cholera-stricken seamen to the hospital. Government have recently sanctioned the addition of an operating theatre to the surgical ward, and a lying-in-room to the women's and children's wards, and these works are now under construction. Dr. Elliot bears testimony to the excellent service rendered by the two lady nurses—Miss Huband and Miss Best, and specially acknowledges the benefit reaped by the cholera patients from Miss Best's nursing. It seems to the Lieutenant-Governor, however, that more permanently good results would be obtained if these ladies were to devote less of their time to personal attendance on the sick, and more to training the large body of nurses now employed in the Hospital.

10. *Campbell Hospital*.—It has already been observed that the admissions to this hospital were 1,147 less in 1876 than in 1875. The death-rate, though still remarkably high, shows a satisfactory decrease from 280 per mille in 1875 to 250. Excluding moribund cases, the mortality was 224 for each thousand treated. It is of course unavoidable that a great proportion of the pauper patients in this hospital should die; and the statement of the prevalent diseases shows that more than three-fourths of the total mortality resulted from ailments chiefly occasioned by malarious poisoning and exposure, aggravated by poverty. The monthly cost per patient has risen from Rs. 16-13 in 1875 to Rs. 17-2-10 in 1876. The excessive expenditure in this hospital has already been adverted to, and is forming the subject of enquiry by a special Committee.

11. *Mayo and Chandney Hospitals*—These hospitals, with their affiliated dispensaries, continue to afford medical aid to the vast bulk of native patients. In all 189,690 persons received treatment at them during the year. The decrease of 4,075, which these figures show on the returns for 1875, is entirely due to a falling off in the attendance of out-door patients at the dispensaries and at the Chandney Hospital. The returns of the out-door patients treated at the Mayo Hospital itself show an increase of 2,079; but those of Park Street and Chitpore Dispensaries exhibit a falling off of 1,797 and 3,561 respectively. This is one of the most unsatisfactory features in the year's report, but no explanation has been offered regarding it. The mortality at these institutions was 127 per mille in 1876, against 117 in 1875. Dr. Beatson has drawn attention to some remarkable divergences in the death-rate from the same diseases at the Mayo and the Chandney Hospitals. This difference has not been explained by the Superintendent, and, as Dr. Beatson remarks, it is the more noticeable, because it may be presumed that the patients in both cases came from the same class of the population.

12. *Howrah Hospital.*—This hospital, with limited funds and accommodation, does much to meet a really serious want, and its increasing popularity and usefulness are highly creditable to Dr. Bird. The past year has seen an increase among all classes of patients, in-door as well as out-door, Christian as well as native. The utmost possible use has been made of available accommodation, and at times the verandahs have been used as wards. The mortality among the Christian and native patients was widely divergent, being only 34 per mille among the former and no less than 218 per mille among the latter. The death-rate was particularly high among native females, 275 among Mussulmans, and 286 among Hindoos. There was a slight decrease in the number of cases of cholera treated; but the disease was of a specially virulent character among the native patients, producing a death-rate of 564 per mille, against 254 in the previous year. Phthisis contributed the high death-rate of 555 per mille. Remittent fever was also of a severe type. Dr. Bird reports very favourably on Warburgh's tincture as a specific for this disease. He says that, "with abundance of this drug at hand, the medical man may confidently count on a successful result in almost every case, provided the patient comes under his care not later than the seventh day of the fever." The remarks of the Magistrate of Howrah on the admirable service rendered by Dr. Bird in connection with this hospital, which owes its establishment and success to his personal exertions, have Mr. Eden's full concurrence.

13. *Other institutions.*—The attention of the Commissioner of Police will be directed to Dr. Woodford's observations upon the state of debility to which many of the up-country constables reduce themselves by their parsimonious habits. No figures of mortality are given for the Sumbhoo Nath Pundit and Arratoon Apcar Dispensaries. A verandah is much required in the last-named building for the use of patients waiting for treatment. The death-rate in the Alipore Dispensary shows a satisfactory decrease from 319 to 136 per mille. The report on the lock-hospitals has been separately considered.

14. The Lieutenant-Governor desires to tender his acknowledgments to Dr. Beatson for his full and excellent report, and for the personal interest with which he has supervised the general management of the hospitals. Dr. Cockburn's inspections have been careful and efficient. Drs. Elliot, Bird, Smith, and Cayley have the satisfaction of knowing that their labours to render the hospitals under their charge worthy of the confidence of the public have been eminently successful.

ORDER.—Ordered that a copy of the Resolution, and of the Report, be submitted for the information of the Government of India in the Home Department.

Ordered also that a copy of the Resolution be forwarded to the Surgeon-General, Indian Medical Department, for information and guidance.

Ordered also that a copy of the Resolution, and of the Report, be forwarded to the Chairman of the Corporation for the town of Calcutta, and to the Commissioner of Police, Calcutta, for information.

By order of the Lieutenant-Governor of Bengal,

S. C. BAYLEY,

*Secretary to the Government of Bengal.*

## ADMINISTRATION REPORT OF THE CALCUTTA MUNICIPALITY FOR 1876.

MUNICIPAL.

*Calcutta, the 7th August* 1877.

READ—

The Administration Report of the Calcutta Municipality for 1876.

Read also—

The Reports for 1874 and 1875 and the Resolutions recorded upon them.

THE new Corporation of Calcutta was only installed in October; the administration of the Municipality during the greater part of the year was therefore in the hands of the Justices appointed under the old law. The elected Commissioners had, however, ample opportunities before the close of the year for declaring the policy on which they intended to proceed, and the Lieutenant-Governor has been made acquainted with their views on the principal questions connected with the municipal control of the town. The elective system has been attended with precisely the results which were anticipated by the framers of the original Municipal Act for Calcutta, when they determined, after mature consideration and discussion, to reject that system as unsuited to the present condition of society in India. Many of the ablest and most useful members of the old Municipality have not unnaturally shrunk from the disagreeable process of a public canvass—a proceeding singularly distasteful to the ideas of native gentlemen. Nearly all the European members have avoided candidature, and have also, most unfortunately for the interests of the town, shrunk from serving as nominated members with the elected candidates. As was foreseen, the elections have introduced into the Municipality many clever, ambitious young men, whose chief aim is to bring themselves before the public and acquire notoriety as speakers, much to the detriment of real business. The Corporation still has, however, in its ranks a fair number of thoughtful, experienced men, and it should be their aim to draw up a scheme for the transaction of business by which all really important questions should be first considered and matured by special committees, who should also be empowered to dispose absolutely of all unimportant business, reporting their proceedings to the Corporation at large. The Municipality should nominate to these committees representative members having special qualifications for the consideration of the subjects referred to them, and should as a rule be prepared to accept the conclusions at which these committee arrive. If this were done, much acrimonious, useless, and mischievous discussion would be avoided, and much valuable time would be saved; under such an arrangement it is to be hoped that some of the experienced European merchants would be induced to lend their valuable assistance in managing the affairs of the city, which it is unreasonable to expect them to do so long as the business of the Corporation is managed at its public meetings as it now is.

The Lieutenant-Governor ventures to draw the attention of the Municipality to the admirable results which have been effected by the Port Commissioners without any public discussion or unnecessary waste of the time of its members, who are all men engaged in business, but who are willing to devote a certain portion of their time to the public good, but who would certainly not have consented to hold office if it involved many hours of public debating on every question however small and unimportant which came before them in connection with the affairs of the Port.

2. The actual revenue collected during the year was Rs. 25,43,216, or Rs. 67,015 more than was anticipated in the budget estimate, and Rs. 32,541 more than was realized in the previous year. The increase is mainly due to the large expansion of the lighting-rate receipts. The receipts on the capital account amounted to Rs. 4,78,820, including two loans from Government,—one for drainage, amounting to Rs. 2,39,400; the other for additional filters at Pultah,

aggregating Rs. 1,45,000. The aggregate amount at the disposal of the Corporation compares thus with the available assets of the two previous years :—

| | 1874. | 1875. | 1876. |
|---|---|---|---|
| | Rs. | Rs. | Rs. |
| Revenue account ... | 24,06,560 | 26,17,994 | 25,43.216 |
| Capital ,, ... | 12,59,618 | 4,94,156 | 4,78,820 |
| Store and advance account ... | 1,45,878 | 1,61,045 | 2,37,246 |
| Cash balance ... | 5,27,325 | 5,01,144 | 1,76,469 |
| Total ... | 43,39,381 | 37,74,339 | 34,35,751 |

The amount entered as receipts on account of stores and advances represents the net balance of the various accounts, of which the particulars are given in the report.

3. The expenditure of the past three years is shown in the following table :—

| | 1874. | 1875. | 1876. |
|---|---|---|---|
| | Rs. | Rs. | Rs. |
| Revenue account ... | 23,33,748 | 30,60,755 | 25,82,596 |
| Capital ,, ... | 15,04,490 | 3,52,560 | 6,23,095 |
| Total ... | 38,38,238 | 34,13,315 | 32,05,691 |

The expenditure on the revenue account was Rs. 1,45,263 less than the estimate and Rs. 4,78,159 less than that of 1875. The decrease under establishment is owing to the payment of the salaries for January 1876 in December 1875 on account of the holidays in connection with the visit of His Royal Highness the Prince of Wales.

4. The total loan liabilities of the Corporation at the close of the year amounted to Rs. 1,50,67,395, bearing annual interest amounting to Rs. 7,34,260, and involving annual contribution of Rs. 2,76,908 to the sinking fund. On the 31st December 1876 the total amount at the credit of the sinking fund was Rs. 12,89,485.

5. The collecting agency was during the year placed on a more satisfactory footing, salaried collectors, with a subordinate establishment of municipal servants, having been substituted for a collector who was paid by commission and who made his own arrangements for collecting the rates. Under the new law, which came into force on the 1st July, the police and lighting-rates became payable in advance, so that the demand for the year included five quarters instead of four. Although the demand was thus enhanced, and in spite of some difficulty arising from the new practice of charging the water-rate, now payable by occupiers and not owners of premises, in the same bill with the police and lighting-rates, the collections under these heads were very satisfactory. They amounted in both cases to 88 per cent. of the demand, as against 87 per cent. realized in 1875. The house-rate assessment was one per cent. lower than in the previous year. Under this head also the collections were one per cent. on the demand in excess of the amount realized in 1875. The collections of the water-rate were less satisfactory. Certain provisions of the new law are responsible for this. The abatement of two per cent. which the old law granted to persons paying up the water-rate demand, within one month of the call, is no longer allowed. Under the new law the rate is ordinarily leviable from occupiers, and not from owners as before. Some difficulty has been found in realizing the rate due from occupiers who have vacated premises, leaving the public demand unsatisfied. Under section 99, too, the Municipality can only require the owner to pay the fourth of the water-rate recognized as his share when the premises have been unoccupied during an entire quarter. When, therefore, premises happen to have been occupied for any part of the quarter, and unoccupied for the remainder, no water-rate at all can be realized for the period of vacancy. It has been shown thus early that the provisions of the new law involve some unnecessary loss of revenue to the municipality.

6. The cost of the repairs of roads exceeded the budget estimate of Rs. 3,00,000 by Rs. 20,380. This, it appears, was chiefly rendered necessary by the postponement of the drainage works for 1875-76 till after the year 1876 had set in. The result was that some of the operations had to be conducted in the rains, and the cost of road-scraping was considerably enhanced.

The greater part of the stone metal used was obtained from the Rajmehal quarries. This indigenous stone has been found to be better adapted for resistance to heavy traffic than imported stone ballast.

7. The daily average number of gallons of filtered water supplied to the town was 6,541,154, an increase of 335,612 gallons over the daily average of the previous year. Of the four additional filters at Pultah, for which the Government last year sanctioned a loan of Rs. 1,45,000, three have been completed since the close of the year. The supply was extended to 705 houses, and two hydrants were placed near the river-bank for the supply of the shipping. The quality of the water is shown by the Analyst's report to have been excellent, and to be generally superior to that supplied to London by the two great Water Companies. Mr. Metcalfe notices the waste of filtered water, chiefly in watering the streets, and hopes to check it by the application of a new pattern of water-cock, and by systematic house to house inspection. The daily supply to the town is about 14 gallons per head, but the amount actually available for human consumption is much less than this. The Commissioners are unwilling to undertake the expense of doubling the filtered supply, but till this is done no system of sanitation for Calcutta can really be complete. The extension of the unfiltered supply, so as to render the whole quantity of filtered water available for the personal wants of the people, is obviously a measure of primary importance, and the Lieutenant-Governor trusts that the Commissioners will soon see their way to carrying it out.

8. Three-quarters of a mile of brick sewers and ten miles of pipe sewers were laid down during the year. Less than a mile of masonry remains to be constructed before the drainage system is complete. Of pipe sewers, however, 47·34 out of 135·17 miles projected have still to be laid down. It is of much importance that this great work should be rapidly pushed on to conclusion. The condition of the open drains which still remain to be replaced requires serious attention, and until these receptacles of stagnant filth are filled or covered up much discomfort and ill-health must be caused. Mr. Eden is glad to learn that the drainage and filling up of the side drains in the Burra Bazar section have been completed. As many as 2,503 premises were connected with the sewers during this year. This is a very satisfactory result, and its good effects will be more marked when the extension of the water-supply renders complete and constant flushing practicable.

9. The cyclone caused some scarcity in poultry at the close of the year by the destruction of fowls and ducks in the districts of Chittagong and Backergunge, the principal sources of supply. Generally speaking, however, provisions of all descriptions were plentiful in the market, and the supply of vegetables was especially abundant.

10. The report of the Analyst shows that the gas supplied to the town has been of very poor illuminating power. The average was only 13·74 standard candles, compared with 16·68, the average power of the London gas in 1875. The Lieutenant-Governor is aware that this deficiency in the Calcutta gas has been the subject of much complaint, and he considers that it is a matter which deserves the particular attention of the Commissioners. The Gas Company should address their efforts to producing a strong illuminating power rather than a specially high standard of purity, which is a matter of secondary importance to the public.

11. The census of the town which was taken on the 6th April has been separately considered. Mr. Eden takes this opportunity of recording his opinion that the thanks tendered by the Corporation to Mr. Beverley for the excellent arrangements made by him and for his admirable report were thoroughly well deserved.

12. The conservancy of the town was generally well attended to. The old system of tollah mehters was not, however, thoroughly satisfactory, and Mr. Eden is aware that since the beginning of the current year it has been superseded by one more suited to the requirements of the town and more capable of effective control.

13. Perhaps the most interesting feature in the year's administration was the subjection of the town to careful sanitary examination at the hands of a qualified Health Officer. Dr. Payne's report deals with particular inquiries instituted, as well as with the general sanitary history of Calcutta and with the conclu-

sions to be drawn from statistical data which have now been collected for the first time on a sound principle. Mr. Eden has read this report with great interest. It displays patient research and great ability in dealing with the difficult problems of sanitation in Calcutta. Mr. Eden would have wished that the tone were more moderate and conciliatory, for he is persuaded that to make sanitation efficient in Calcutta the people of the city must be led, and not driven, into co-operation with the Sanitary Department. Dr. Payne should bear in mind that one case in which native society is induced by conviction to adopt a sanitary theory is worth hundreds of cases in which they are pressed into submitting to reforms of the benefits of which they are not satisfied. The Sanitary Officer must remember that the principles and theories which to him seem so obvious and so indisputable have not even yet received practical acceptation in many countries in a much more advanced condition of social progress than India, and that more is to be gained by patiently and gently endeavouring to establish the soundness of these theories by practical results than by hard language in respect of those who are not prepared to accept at once the conclusions at which he may have arrived after many years of hard study of the whole subject. In some of the finest cities in civilized Europe, with every appliance and convenience for sanitary improvement available, there are streets, lanes, and houses whose description, if faithfully given, would throw into the shade the vivid pictures of the filth of Calcutta so graphically drawn by Dr. Payne.

No real good is to be gained by laying before the people quarter after quarter in a formal report violent denunciations of their habits of life. What the Municipality should do is to bring within the reach of the people fresh pure water and efficient drainage, and by showing them by practical experience the beneficial results of allowing dirty water tanks to be filled in. Dr. Payne's own report bears the most conclusive evidence that the people are perfectly ready to use pure water when they can get it, and that they are quite open to conviction in respect to the filling in of impure tanks. The people must have some water, and if the Municipality do not supply them with a sufficiency of pure water, they are driven to the use of that which is impure. The blame attaches to the Municipality, not to the people, who pay water-rates, but do not get water. In describing the effect of the rainfall on the public health, Dr. Payne says:—"The great demand for good water, and the wide-spread use of it in private houses, led to its being stopped in hours of great need among the labouring people, who were driven back to the dirty tanks for their supply: these are the classes among whom cholera now remains." It is clear from this that a strong demand for pure water does exist among even the lowest classes of natives, and that it is only when this supply was shut off by the Municipal Corporation that they were driven back to the use of foul tanks, with the result of an outbreak of cholera. It is difficult to conceive a greater reproach to the Municipal administration than the fact that while the streets of the wealthy quarters of the town are watered with filtered water, the supply of the poor was stopped and they were driven to the use of what the Sanitary Commissioner describes as excrement and water. Dr. Payne has asserted of the water-supply by pipes that "its benefits were so keenly appreciated that the people generally, though doubtless gradually, resorted to the hydrants, which were in every neighbourhood within moderate distance." The people of the suburbs of all classes are described as "carrying hydrant water to some distance for drinking and cooking use." "The demand for pure water," he goes on to say, "has rapidly outgrown expectation and provision, and the desire to extend its benefits more widely has led to their being curtailed in quarters where at first there was no restriction. Reckless waste also on the part of the people has brought further necessity for limiting pressure as the only means of arresting it. That this limitation has worked very perniciously on the public health cannot, I fear, be doubted, for many people have been driven for personal and other ablution to the filthy stagnant pools of sewage called tanks." "To those who live beyond reach of the river, and have to labour through the day, there has been nothing better available in the evening over a large portion of the town than the poisonous contents of these tanks." Surely this is a state of things for which the Municipality, and not the rate-payers, are to blame. When people are driven to drink sewage by the neglect to supply them with

water, it seems to be adding insult to injury to describe them as revelling in sewage and drinking excrement and water as a matter of taste and choice. It is just as unreasonable as it is to describe the people, in another part of the report, as being unprovided with the most ordinary means and appliances of cleanly life, and then, because their habitations and neighbourhoods are dirty, to accuse them of "preferring disease to discipline." The one thing which is established, and this is most clearly established in the opinion of the Lieutenant-Governor, is that the state of mortality in the town of Calcutta is most seriously affected by the insufficient supply of pure water now available to the people; and he is satisfied that it is the first duty of the Municipal Corporation to take measures to improve their supply. It is in their power to do much in this direction by keeping up the pressure on the pipes day and night and economizing the use of filtered water by substituting unfiltered water for the purpose of street-watering and sewer-flushing.

It has long been a matter of perplexity to inquirers that, while the death-rate of Calcutta has been so low as to give it a high place for salubrity among the great cities of the world, it was well known that it contained large areas which presented conditions of filth, overcrowding, and bad ventilation which ought, *primâ facie*, to lead to very different results. The first special inquiry held by Dr. Payne into an outbreak of cholera suggested the solution of this anomaly, and the results of the census immediately afterwards taken afford remarkable confirmation of his conclusions. It has been found that only 28 per cent. of the inhabitants of Calcutta were born in the town, while the number of males, as compared with females, was 262,455 to 146,581. Clearly, therefore, the town population is not one of local growth. The great mass of the male population is composed of migratory labourers and artisans, who visit Calcutta for a time and return to their homes periodically. The females, on the other hand, though in many cases they move with the males, are more or less a fixed population. This is made clear by the statistics of the female population. Considerably less than half of the women in Calcutta are returned as married, while the number of widows and of women not described is nearly as large as that of the married females.

The men for the most part are enabled, by the temporary nature of their connection with Calcutta, to betake themselves to their homes when they are attacked by any but immediately prostrating sickness. Except, therefore, from acute diseases such as cholera, only a small proportion of males actually die in the town. This theory accounts for the remarkable difference in the male and female death-rate among both Hindus and Mahomedans. The ratio of male deaths to every 1,000 of population is 28·2 and 22·8, and that of female deaths 36·7 and 41·3 respectively. Many other subsidiary proofs are adduced by Dr. Payne in support of his view. It may be considered, therefore, as established that the hitherto recorded death-rate among Hindus and Mahomedans in Calcutta, even so far as the figures are accurate, fail to convey a correct view of the healthiness or unhealthiness of the city.

14. The birth statistics of Calcutta have also been long recognized as anomalous. Until 1875 the ratio of recorded births to every 1,000 of the population never amounted to 14. The facts brought to light by the census go far to explain this. It is shown that there is relatively a small female population, of which again the child-bearing proportion is also abnormally small. It is admitted, however, that the number registered is still considerably less than the actual number of births, and that many errors occur in the record of those which find entry in the registers. In April 1875, when special measures were taken by the police to promulgate the requirements of the law, the number of registered births rose to 778 from 393 registered in March. During the last four months of 1876 the average number registered was 725, and the total registered birth-rate for the year was 17·3 per mille. It is not probable that the birth-rate of Calcutta really exceeds 22 or 23 per mille, so that the hope is not unreasonably entertained that with the increased attention which is being paid to the subject an approximately accurate birth-rate will soon be attained.

15. Dr. Payne's general survey of the sanitary history and of the present condition of the health of the town, and his examination of the operation of the different manifest causes, are able and interesting. The history of cholera during the past eight years affords specially valuable data on which to

proceed. This, the most virulent and fatal of zymotic diseases, is well known to the most ignorant of the people, and there is no likelihood that cases of it, as of some other of the acute maladies, would be described under the generic term of fever. Moreover, as its attacks are ordinarily sudden and its effects rapid, it may be generally assumed that persons struck down by it do not, as in the case of more lingering affections, leave the town before it has run its course. The recorded deaths under this head must therefore be taken as a true test of the prevalence of the disease during any given period. The following table shows the deaths from cholera during the past nine years :—

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1868 | ... | ... | 4,186 | 1873 | ... | ... | 1,155 |
| 1869 | ... | ... | 3,592 | 1874 | ... | ... | 1,329 |
| 1870 | ... | ... | 1,563 | 1875 | ... | ... | 1,726 |
| 1871 | ... | ... | 800 | 1876 | ... | ... | 1,871 |
| 1872 | ... | ... | 1,142 | | | | |

It is obvious from these figures that some specially favourable influences have been at work since 1869, and that, although cholera mortality is still small compared with that of the period immediately preceding that year, it is steadily increasing from the minimum attained in 1871. Dr. Payne has satisfactorily disposed of the argument, which has found some supporters, that the progress of under-ground drainage, which was extended to the northern part of the town in 1869, may be responsible for the increasing mortality. It is true that the open ditches, which were formerly scoured by heavy rain, are now in all cases separated from adjacent sewers by gratings, which only admit of the passage of the liquid sewage, and not of solid filth, and that this must always be the case until the ditches are all replaced by sewers. But this is only a proof of the necessity of pushing on the drainage system to completion and of providing more active conservancy, and affords no argument for the abandonment of works which the experience of the civilized world has shown to be necessary for the sanitation of large cities. Dr. Payne's analysis of the monthly statistics of cholera during this period afford very conclusive proof of the sanitary effects of the extension of the filtered water-supply to all parts of the town. This great boon was first conferred on the people of Calcutta in August 1869. In November and December of that year, the period when autumnal cholera ordinarily makes its appearance in force, only 136 deaths occurred, as compared with 757 in the corresponding two months of the previous year. Similarly, in the opening months of 1870 a marked decrease was observable, and the total number of deaths in that year was 1,563, as against 3,592 in 1869. In 1871 a still more noticeable diminution occurred. Those months when cholera is usually most virulent were actually more healthy than the more favourable months in previous years, and the total number of deaths in the year was only 800. The beginning of 1872 was equally healthy. In April in that year it was found necessary to stop the night pressure of ten feet of water which had been previously allowed. The total number of cholera deaths in 1872 was 1,142, and ever since there has been a steady annual increase until 1876, when the total of 1,871 deaths was attained.

16. The following table gives the mortality among the different races in 1876, as shown by the actual number of deaths which occurred in the town :—

| | Ratio of deaths per 1,000 of population. | | |
|---|---|---|---|
| | Male. | Female. | Combined. |
| Non-Asiatics ... ... ... | 26·2 | 12·8 | 22·2 |
| Mixed races ... ... ... | 50·2 | 46·9 | 48·5 |
| Hindus ... ... ... | 28·2 | 36·7 | 31·3 |
| Mahomedans ... ... ... | 22·8 | 41·3 | 28 |

Calcutta is really more healthy for Europeans than even these figures show. They include deaths among sailors, due not to the effects of the climate, but to exposure and reckless excess. Not a single death occurred among men of this class in the Presidency Jail during the year. Among those in the shipping, however, the death-rate was 51 per 1,000. The death-rate in the Fort William garrison was only 7 per 1,000. Leaving the shipping population aside, we obtain a rate of 18 per 1,000 for male residents of the white races. It is true that the great bulk of the European population of Calcutta is composed of persons at the middle periods of life, and from this it

is sometimes argued that a favourable death-rate is necessarily to be expected. It is forgotten, however, that if the very advanced ages are little represented, so is the period between 10 and 20 years, when the death-rate in England is lowest. The death-rate among European females in Calcutta is very low, and the healthiness of young European children is remarkable. In the European Female Orphan Asylum, where the mean daily number of children maintained is 60, there have been only three cases of fatal illness during the last nine years. On the whole, the conditions of the comparison between England and Calcutta are not unfair. The result is that the European quarter of Calcutta is shown to be very salubrious, and the climate to be distinctly favourable to European life. The mixed races form the most stable portion of the population. Their death-rate per mille is 48·5. In mortality from cholera and in infant mortality—perhaps the only two cases in which a fair comparison can be made—their death-rate is below that of the natives. It must also be recollected that many Eurasians are housed and live as carefully as Europeans. There can be no reasonable doubt that the true native death-rate considerably exceeds that of these mixed races, and Mr. Eden observes that it is placed by Dr. Payne as high as 50 per thousand.

17. It is now quite clear that the middle and northern wards of the town produce a rate of mortality which the Government cannot contemplate without concern; and it has been shown that the hot-beds of zymotic disease are to be found in the clusters of native huts known as *bustees*. The condition of these bustees has engaged the attention of the Bengal, Indian, and Home Governments for many years. Dr. Payne's report leaves no doubt of the direction in which the duty of those responsible for the well-being of the town now lies; and Mr. Eden regrets to find that no allotment has been made from municipal funds for the current year for the survey of lands to be improved. The Lieutenant-Governor is willing to admit that the improvement of the bustees can only be gradually undertaken, with due regard to the state of the municipal finances, and that there are some special difficulties to be overcome; but he trusts the Commissioners will see their way to some scheme for gradually and systematically dealing with a state of things which is certainly not creditable to such a Corporation as that of Calcutta. The first thing is to provide good water, and the people will not then be so anxious to cling to the filthy water, which, according to Dr. Payne, is in a great portion of the town the only supply available to them. They not unnaturally prefer bad water to no water at all. Mr. Eden believes that the proper way of dealing with these bustees is for the Municipality to set aside a certain amount of money every year, and to buy up block after block of bustee, clear it, drain it, lay it out with roads, fill in all dirty tanks and hollows, and then sell the land thus reclaimed in convenient lots for the erection of houses for the people on plans to be approved by the Municipality. The owners of these bustees are frequently not in a condition to pay for their improvement, even though it be shown to them beyond question that the value of the land will be enormously improved by the removal of nuisances and the levelling of the land. If the matter were taken up systematically by the Municipality, they would probably find that the profit of reclamation was so certain as to warrant their raising special loans for the subject, and thus in a few years getting rid of these great sources of disease. The existence of great mortality, and the causes to which it is largely to be attributed, have now been clearly laid before the Commissioners by a thoroughly competent servant of the Municipality. The Lieutenant-Governor regrets to find that the reclamation of these bustees has been a fruitful source of acrimonious and polemical discussion between the Sanitary Commissioner and the Municipality. There is no doubt that it is a question on both sides of which there is much to be said, and he trusts that in future this important subject may be discussed with mutual forbearance and due consideration for differences of opinion, and in the end he believes that the Municipality and the Sanitary Commissioner will be found to be working together in this matter for the common good of the city. There seems to be no sort of doubt that the bustees and the filthy tanks they contain are a public nuisance. How far the smell of the tanks is worse than the smell of the sweepings that are employed in filling them in is not a material question. It seems certain that so soon as a proper water-supply and proper bathing tanks

are provided by the Municipality, these holes should be filled in. The Lieutenant-Governor is disposed to believe, as the result of his experience—and he has watched the operation in several towns—that the use of sweepings, though unpleasant for a time, is not altogether dangerous to the public health, especially if a layer of earth is daily laid over the sweepings, and whatever inconvenience ensues is temporary, while that arising from the tanks is permanent. But of course much must depend on the nature of the sweepings employed and the time of year at which the work is carried on. Indeed, the whole question of the immediate and direct disease-producing effect of sewage exposed to the air is to a certain extent an open one: it is an idea which, it is not difficult to see, cannot be expected at first sight to carry conviction to the native mind; and that the views of the Sanitary Commissioner should have led to discussion is not to the Lieutenant-Governor a matter of surprise.

The Lieutenant-Governor's own view, formed on a dispassionate consideration of the whole question, is that these tanks are very mischievous in their effects; that they are a reproach to such a city as Calcutta; and that they should be filled in on a thoroughly well-prepared system block by block: and if this is done simultaneously with a proper supply of drinking water from hydrants and bathing water from reservoirs capable of being emptied and replenished as occasion might require, Mr. Eden is satisfied that the native inhabitants of Calcutta will not be found obstructive in regard to such an obvious reform in a matter affecting their personal health and comfort. That the people are not slow to accept sanitary reform if pressed upon them with tact, and in such a manner as to carry conviction as the result of practical teaching, is clear from the statement made by Dr. Payne at page 24 of his report—"From that time complaint has been rare and applications are now received for the filling in of tanks in numbers far exceeding the Engineer's powers of compliance." From this it would seem that the difficulty of persuading the natives to consent to the filling in of tanks has practically been solved; and the Lieutenant-Governor is satisfied that there is nothing which really retards the improvement of the town so much as the long, desultory, recriminating discussions which so constantly take place at the municipal meetings; it is to remedy this, and to secure the harmonious and quiet transaction of real business by select committees, that the Chairman should endeavour to obtain the co-operation of the Municipal Commissioners. There are a sufficient number of sensible, practical, and experienced gentlemen in the Corporation to make it a matter of certainty that if irritating, useless, and exciting discussions can be avoided, the work of sanitary reform will be carried out vigorously and earnestly.

18. It appears that 17,355 municipal cases were disposed of by Justices sitting at the police-office. The Justices who interested themselves most in this duty were Baboo Umesh Chunder Dutt, Moulvie Kubeeruddeen Ahmed, Mr. Manockjee Rustomjee, and Baboo Khelat Chunder Ghose. The Lieutenant-Governor cannot consider that the result of the trials was satisfactory, or such as is likely to prevent a recurrence of offences against the law. Only 167 persons out of 18,125 were acquitted, yet the total amount of the fines inflicted was only Rs. 9,772. No less than 3,364 persons were discharged with a warning, and 668 were discharged on payment of the fee which they had sought to evade. Mr. Eden is inclined to consider this leniency somewhat ill-judged.

19. Mr. Metcalfe, who entered upon the office of Chairman shortly after the new municipal constitution came into force, has displayed much patience under difficult and trying circumstances. Dr. Payne, in his capacity of Health Officer, is rendering service which will, Mr. Eden hopes, be some day gratefully remembered by the people of Calcutta. Mr. Turnbull continues to give universal satisfaction as Secretary to the Corporation. The subordinate officials, among whom Mr. Dissent is prominently mentioned, have discharged their duties with zeal and efficiency.

By order of the Lieutenant-Governor of Bengal,

S. C. BAYLEY,

*Secy. to the Govt. of Bengal.*

## RESOLUTION ON THE REPORT ON THE CALCUTTA COURT OF SMALL CAUSES FOR 1876-77.

JUDICIAL.

*Calcutta, the 30th July* 1877.

READ—

Report on the Calcutta Court of Small Causes for 1876-77.

THE report now submitted shows a great falling off in the number of cases instituted. Altogether 32,640 suits were brought, as against 34,502 in 1875-76 and 34,843 in 1872-73. The amount in litigation was Rs. 14,42,611, against Rs. 15,82,873 and Rs. 16,23,110. The diminution in the number of suits is chiefly observable under the heads of goods sold and delivered, bills of exchange and promissory notes, money paid, money lent, money had and received, and account stated.

2. The Judges have offered what appears to the Lieutenant-Governor to be probably a correct explanation of the marked decrease in the number of suits of the smaller values. It was decided by the High Court in April 1873 that the Court of Small Causes has no power to seize tiled huts in execution of its decrees. This ruling removed from the operation of the law an important item of security theretofore tendered by debtors, and the result was a falling off in the extent of the credit allowed them. The full effect of the decision in question was not observed until the beginning of the past year, when limitation began to bar the institution of suits brought on transactions which had been entered into on the faith of the debtor possessing a tiled hut. The influence of this ruling may also be traced in the diminished number of interpleader suits, which naturally decrease as restrictions are imposed on the execution of decrees. The Judges think it possible that institutions may have been to some extent affected by the exclusion of touters or suit-brokers. Mr. Eden is disposed to consider the removal of these persons an unmixed good. It is not clear that their absence can have had any tangible effect on the number of claims advanced. Their attentions must necessarily have been confined to persons actually visiting the Small Cause Courts, and such persons would require no special encouragement to induce them to institute their cases. Mr. Eden quite agrees with the Judges in thinking that the gain to the interests of justice and fair dealing much exceeds any theoretical disadvantages attending on the suppression of this class of practitioners.

3. But the causes to which the falling off in the number of suits of the lower values is attributed will not account for the decrease in the higher class of suits. A comparison of the institutions in this class of cases during the past four years stands thus :—

| | 1873-74. | 1874-75. | 1875-76. | 1876-77. |
|---|---|---|---|---|
| Rs. 500 to Rs. 1,000 ... | 480 | 473 | 502 | 485 |
| Above Rs. 1,000 ... ... | 27 | 36 | 41 | 44 |
| Total ... | 507 | 509 | 543 | 529 |

The Lieutenant-Governor would have expected a large increase in litigation of this class owing to the great impetus which the export trade has received during the past year.

4. The results of the trials seem to show that unfounded and harassing claims are still advanced, most of them of course for small amounts. During the past two years cases have been disposed of with the following results :—

| | 1875-76. | | 1876-77. | |
|---|---|---|---|---|
| For plaintiff after trial ... | 7,789 | | 7,073 | |
| „ „ *ex parte* ... | 7,325 | | 6,917 | |
| Compromised ... ... | 12,197 | | 11,501 | |
| Non-suited ... ... | 3,015 | Against plaintiff, 7,351. | 2,515 | Against plaintiff, 7,101. |
| Dismissed after trial ... | 1,361 | | 1,504 | |
| „ in default of plaintiff | 2,975 | | 3,082 | |
| Total ... | 34,662 | | 32,592 | |

5. The number of commissions received by the court has increased from 226 in the previous year to 266 in 1876-77. The Judges draw attention to the discretion allowed to the issuing court by section 385 of the new Civil Procedure Code to select any person whom it thinks fit, and they ask that the High Court may be moved to direct the Judges of the different courts to issue the commissions, when practicable, to some pleaders of the court. The Hon'ble Judges of the High Court will be consulted on this point.

ORDER.—Ordered that a copy of this Resolution be forwarded to the Judges of the Calcutta Court of Small Causes, and that a reference be made to the High Court as indicated in paragraph 5.

By order of the Lieutenant-Governor of Bengal,

S. C. BAYLEY,
*Secretary to the Government of Bengal.*

## LIBERALITY OF BABOOS PANNA LAUL AND DOORGA PERSAUD.

No. 2285, dated Calcutta, the 7th August 1877.

From—H. H. Risley, Esq., Offg. Under-Secy. to the Government of Bengal,
To—The Vice-Chairman to the Port Commissioners.

In acknowledging the receipt of your letter, No. 1535, of the 28th July 1877, reporting that the Bathing Ghât in memory of the deceased Baboo Chuttoo Laul has been completed, and forwarding for submission to His Honor the Lieutenant-Governor a photograph of the ghât as seen from the Hooghly Bridge, I am directed to say that the Lieutenant-Governor has much pleasure in acknowledging the liberality and public spirit of Baboos Panna Laul and Doorga Persaud, heirs of the late Chuttoo Laul, merchant of Calcutta and Furruckabad, in having contributed so materially to the fund for providing the ghât in question.

2. I am to add that this correspondence will be published in the next issue of the *Calcutta Gazette*.

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No. 1535, dated Calcutta, the 28th July 1877.

From—W. D. Bauce, Esq., c.e., Vice-Chairman to the Port Commissioners,
To—The Secretary to the Government of Bengal, General Department.

I have the honor to report that the Bathing ghât, the construction of which was sanctioned by Government letter No. 317, dated 29th January 1875, has been completed, and now forward, for submission to His Honor the Lieutenant-Governor, the accompanying photograph of the ghât as seen from the Hooghly Bridge.

2. In submitting this report of the completion of the work, I am desired to bring to the notice of Government the public spirit and liberality displayed by the heirs of the late Baboo Chutto Laul of Calcutta. These gentlemen have added to the handsome bequest of one lakh of rupees, left by the deceased for the erection of a ghât on the bank of the Hooghly, the liberal donation of Rs. 32,500, which was required to complete the building in a suitable manner, and to provide for its permanent maintenance.

3. Baboo Chuttoo Laul having left, by his will, the sum of one hundred thousand rupees for the construction of a public Bathing ghât on the riverside at Calcutta, Baboo Ram Nath, the agent of Baboo Chuttoo Laul's heirs and representatives, wrote to the Commissioners asking permission to carry out the wishes and instructions of the testator.

4. The Commissioners acceded to the request subject to certain conditions, and through the assistance of Rai Greesh Chunder Doss, Bahadoor, Superintendent of the Government Toshakhana, Foreign Department, who throughout has taken the greatest interest in the construction of the proposed ghât, and materially assisted in settling the details of the agreement with the Commissioners, it was eventually arranged that the site of the ghât should be immediately to the north of the Calcutta abutment of the Hooghly Bridge; that it should be built on a plan approved by and under the direct superintendence of the Commissioners; and that the heirs of Baboo Chuttoo Laul should deposit the full amount which the work was estimated to cost in the Bank of Bengal, to the credit of the Commissioners, before the work was begun. The heirs also agreed to deposit with the Commissioners such a sum in Government promissory notes as would enable the Commissioners from its interest to keep the ghât in a state of permanent repair.

5. A premium was thereupon offered for a design of the ghât, and the plan submitted by Mr. Bayne of Calcutta being selected as the best, Messrs. Mackintosh, Burn and Co. were entrusted with the work at a cost of Rs. 95,000. Subsequently, additions were made to the buildings at the request of the heirs, and the total sum spent on the ghât amounted to Rs. 1,17,000, which, with Rs. 15,000 invested in Government securities and placed with the Commissioners for the permanent maintenance of the ghât, makes a total of Rs. 1,32,000 laid out by the heirs of Baboo Chutto Laul on this work of public utility.

6. The following tablet has been put up inside the ghât:—

> "This ghât was erected by Lalla Panna Laul and Doorga Persaud, and is dedicated to the public to perpetuate the memory of Baboo Chuttoo Laul, merchant of Calcutta and Furruckabad. The cost of the ghât, Rs. 1,00,000, was defrayed out of the monies of Baboo Chuttoo Laul."

7. The ghât was completed and thrown open to the public in May 1876, and its benefits are fully appreciated by the public, as evinced by the large number of people who use it daily. It is also an ornament to the river frontage of Calcutta.

8. The Commissioners would take the liberty of suggesting that a notice of this work of public utility should be given in the Government Gazette, and the thanks of Government conveyed to Baboo Panna Laul and Baboo Doorga Persaud for their liberality.

## MEMORANDUM ON THE STOCK OF RICE IN CALCUTTA.

On the 25th July a telegram was received from the Viceroy making inquiry as to the stock of rice in Calcutta and the reserve for export.

2. In the report on the internal trade of Bengal by Mr. Cotton, Junior Secretary to this Government, which is now in the press, the following statement is given, based on the returns of traffic received from the registering stations established in 1875-76 and on the returns of the Calcutta Custom House:—

| | Imports of rice into Calcutta. | Exports by sea from Calcutta. |
|---|---|---|
| 1876. | Mds. | Mds. |
| April ... ... ... ... | 6,36,505 | 5,11,528 |
| May ... ... ... ... | 3,73,349 | 4,43,482 |
| June ... ... ... ... | 3,43,979 | 3,44,058 |
| July ... ... ... ... | 8,25,554 | 5,64,403 |
| August ... ... ... ... | 8,08,826 | 8,01,437 |
| September ... ... ... ... | 8,09,640 | 8,40,741 |
| October ... ... ... ... | 7,82,363 | 10,82,870 |
| November ... ... ... ... | 15,70,657 | 19,53,326 |
| December ... ... ... ... | 27,05,554 | 34,67,840 |
| 1877. | | |
| January ... ... ... ... | 39,26,339 | 34,95,388 |
| February ... ... ... ... | 29,57,916 | 28,50,359 |
| March ... ... ... ... | 21,78,572 | 24,49,269 |
| | 1,79,19,254 | ..... |
| By Calcutta and South-Eastern State Railway ... | 20,100 | ..... |
| Total ... | 1,79,39,354 | 1,88,04,701 |

3. Mr. Cotton calculated that 17½ lakhs of maunds came in without being registered, as well as 8,41,700 maunds of paddy, and that Calcutta and its Suburbs consumed annually 41 lakhs of maunds. He therefore finally adopted the following figures:—

| | Mds. |
|---|---|
| Rice imported into Calcutta ... ... ... ... | 1,79,39,300 |
| Paddy (8,41,700 maunds = in rice) ... ... ... ... | 5,26,100 |
| Supplies unregistered ... ... ... ... ... | 17,50,000 |
| Total ... ... | 2,02,15,400 |
| Against— | |
| Rice exported by sea ... ... ... ... ... | 1,88 04,700 |
| Paddy (34,200 maunds = in rice) ... ... ... ... | 21,400 |
| Rice consumed in Calcutta ... ... ... ... ... | 41,00,000 |
| Total ... ... | 2,29,26,100 |

leaving a deficiency of imports as against exports of 27 lakhs of maunds.

4. This deficiency, Mr. Cotton suggested, had been caused by the large exportations to Madras, and had been met from the old stocks in Calcutta itself. He stated that inquiries had shown that the average annual stock in trade in the metropolitan market was a stock sufficient for about two years' local consumption, *i.e.* that there were usually about 70 or 80 lakhs of maunds in Calcutta, the Suburbs, and Howrah. He thought that at the close of the year 1876-77 these stocks did not exceed one year's consumption, *i.e.* 41 lakhs of maunds.

5. His figures of consumption he found thus:—

| | Population. |
|---|---|
| Calcutta proper ... ... ... ... ... ... | 429,535 |
| Suburban municipality ... ... ... ... ... | 257,149 |
| North and South Suburban Towns ... ... ... ... | 89,896 |
| Howrah ... ... ... ... ... ... | 97,784 |
| Total ... | 874,363 |

To this total he added 25,637 for other outlying suburbs, taking the total metropolitan population at 900,000 souls. Allowing half a seer of rice per head per diem, he got a total annual consumption of 41 lakhs of maunds.

6. It did not appear possible to accept the figures of sea exports given in the above statement, as it was discovered that they were compiled from the customs monthly returns, which, as regards grain shipped to free ports, are now known to be very inaccurate. The actual amounts exported have been much lower than

those shown in the returns, owing to the failure to deduct in all cases short shipments and relands. A statement is appended showing the actual shipments from 1st February to 25rd July. The Customs Returns from 1st February to the end of June only show 73,22,828 maunds exported to Madras ports and 10,54,055 maunds exported to Bombay ports. On the other hand, much reliance could not be placed upon the accuracy of the returns of inland traffic, the probability being that the quantity of unregistered grain is much greater than that estimated.

7. It was deemed better to endeavour by local inquiry to arrive at some knowledge of the stocks actually in Calcutta than to trust to a calculation resting upon premises known to be of doubtful value.

8. The native officer who was deputed to this duty is well acquainted with Calcutta, and had frequently been employed before on similar investigations. In his report he stated that the stock on the days of his inquiry (25th to 27th July) stood in round numbers at 50 lakhs of maunds, distributed as follows:—

| | Mds. |
|---|---|
| At Baliaghatta and Ooltadangah ... ... ... ... | 9,20,000 |
| Hatkhola and Coomertolly ... ... ... ... | 6,50,000 |
| Other marts within Calcutta ... ... ... ... | 9,25,000 |
| Tallygunge ... ... ... ... ... | 2,15,000 |
| Chitlah ... ... ... ... ... | 20,000 |
| Kidderpore, Moonsheegunge, and other adjoining marts ... | 5,00,000 |
| | (*a*)32,30,000 |
| Add Seebpore, Ramkistopore, Howrah Town, Sulkeah, Goosery, Bally, &c. ... ... ... ... ... | (*b*)12,00,000 |
| Railway jetties, Gurreah, Kassipore, Burranagore and other outlying places ... ... ... ... ... ... | (*c*)5,70,000 |
| | 50,00,000 |

9. In respect of all the places that go to make up the total (*a*), the figures were estimated after careful local inquiry and inspection. The totals (*b*) and (*c*) were given on the basis of an inspection made some little time back, but there is now reason to believe that the stocks in many of these golahs have been considerably reduced. Where a steady and enormous exportation is going on, and where importation may be checked for a few days by bores on the river, bad weather, and such like causes, it is obvious that the stocks at particular places may vary greatly within the limits of a single week.

10. On the whole, however, there is a very general belief among those of the native community who have been consulted that the estimate of 50 lakhs of maunds, taking in, as it does, the considerable marts on the other side of the river, is probably not very far wrong even now—increase in some places counterbalancing decrease in others.

11. It should be observed that in the above estimate are included all the stocks for local consumption in the hands of the numerous petty traders, of whom there are several in each bazar. (Twenty-one bazars were visited in Calcutta itself, where 1,20,000 maunds were found. There were as many more known bazars which there was no time to see.) It includes also all the laden boats on the river, which were counted and classified by maundage. They were on the day of inquiry 1,219 in number, and were estimated to hold 5½ lakhs of maunds at the very least.

12. The native merchants who were consulted were unanimous in holding that Calcutta keeps in ordinary years two years' stocks; that these are now depleted about one-half; and that when full they are probably from 80 lakhs to a crore of maunds.

13. There seemed, therefore, no reason to suspect the general accuracy of the estimate. The amount shown by the details of the inquiry in the hands of arathdars, who usually supply grain for export, was about 10 lakhs of maunds. This was not utterly irreconcilable with the estimates given by the European prices-current, which put the stocks for export at 6 lakhs of maunds. Each European house can only go on the information it can individually get, and probably none of them, or of the brokers who supply their information, could furnish a complete list even of the araths on and near the canals. It is believed that on this point our information is far more complete.

14. But when it was asserted positively that the whole stock in Calcutta, including stock for local consumption, was only 6 lakhs of maunds, that daily

supplies now furnished daily consumption (a state of things in which one would expect to find prices at famine rates), the Lieutenant-Governor thought it necessary to depute a European officer in conjunction with the native officer who had before inquired to go carefully through all the stores in Calcutta to ascertain what the actual truth is. Mr. Newbery, late Collector of Chittagong, was appointed to this duty.

15. Their first day's inquiry (Saturday's) demonstrated the inaccuracy of the estimate relied upon by the European houses, for they found at Baliaghatta alone, in the hands of eleven arathdars, 5,01,900 maunds of rice, besides 2,00,000 maunds in smaller araths and on boats.

16. Mr. Newbery will submit daily reports, the results of which will be summarised and published hereafter.

17. Meantime, however, on Saturday, a native gentleman largely engaged in the rice trade called at this office, at the request of a leading member of native society, and gave the following information, for the general accuracy of which he vouched. He said the stocks in Calcutta now are—

| | Mds. |
|---|---|
| At Tollygunge and Kidderpore and Chitlah ... ... | 2,50,000 |
| At Baliaghatta ... ... ... ... | 7,00,000 |
| At Ooltadangah ... ... ... ... | 25,000 |
| At Puthuriaghatta, Hatkhola, and other places near ... | 8,50,000 |
| Total ... | 18,25,000 |

This excludes all internal bazars, retail stocks, all stocks in boats, and stocks across the river. If these were taken into account, he did not think that our estimated total (*a*) was at all excessive ten days ago; and of course a considerable addition would have to be made to his total above—probably it would have to be nearly doubled.

18. He gave in detail a list of arrivals expected between now and the 1st October, and they show a total of about 75 lakhs of maunds. It is impossible, however, that any one man should know all the rice coming down. But it is extremely unlikely that any one engaged in the trade would willingly exaggerate the stocks.

19. District officers have been called upon for rough estimates of the probable stocks in their districts at present, and the replies received up to date will be published in the Gazette. There is every reason to believe that large stocks are still available, which will come out more freely as the *aous* harvest is reaped and the prospects of the *amun* become assured. Precise figures cannot be expected, looking to the way in which stocks are held in Bengal; but a fair general idea may be gathered from prices and local inquiry in most districts.

20. It must also be borne in mind that nearly the whole of the crop of Rungpore and Dinagepore, known as the moongee crop, and which alone represents a very large stock, has yet to come into the market. These stocks do not come down till the rivers rise, and in this year the arrivals are likely to be late.

A. MACKENZIE,

*Offg. Secy. to the Govt. of Bengal.*

CALCUTTA,
*The 7th August* 1877.

## ABSTRACT.

*Actual Exports of Rice from Calcutta to Madras and other Ports from 1st February to 23rd July 1877.*

[As by information received from Agents in respect of each vessel leaving the Port.]

### MADRAS PORTS.

MESSRS. MACKINNON, MACKENZIE'S STEAMERS.

| | Mds. | Mds. |
|---|---|---|
| 1. Madras ... ... ... ... ... | 2,68,626 | |
| 2. Pondicherry ... ... ... ... ... | 51,382 | |
| 3. Negapatam ... ... ... ... ... | 3,21,314 | |
| 4. Tuticorin ... ... ... ... ... | 3,25,016 | |
| 5. Calicut ... ... ... ... ... | 67,040 | |
| 6. Badagory ... ... ... ... ... | 21,466 | |
| 7. Tellicherry ... ... ... ... ... | 27,062 | |
| 8. Cannanore ... ... ... ... ... | 24,592 | |
| 9. Mangalore ... ... ... ... ... | 7,400 | 11,15,060 |

*Other Ship Agents in Calcutta.*

| | | |
|---|---|---|
| February ... ... ... ... ... ... | 8,45,678 | |
| March ... ... ... ... ... ... | 7,19,282 | |
| April ... ... ... ... ... ... | 4,60,229 | |
| May ... ... ... ... ... ... | 7,29,662 | |
| June ... ... ... ... ... ... | 6,54,490 | |
| July ... ... ... ... ... ... | 9,28,660 | 45,46,994 |
| GRAND TOTAL ... ..... | | 56,62,054 |

### BOMBAY AND OTHER PORTS.

MESSRS. MACKINNON, MACKENZIE'S STEAMERS.

| | Mds. | Mds. |
|---|---|---|
| *Foreign Ports.* | | |
| Jaffna ... ... ... ... ... ... | 4,120 | |
| Batticolla ... ... ... ... ... | 5,128 | |
| Galle ... ... ... ... ... | 60,620 | |
| Colombo ... ... ... ... ... | 275,260 | 3,49,320 |
| *Indian Ports.* | | |
| Narakel and Cochin ... ... ... ... | 30,576 | |
| Carnar ... ... ... ... ... ... | 2,976 | |
| Bombay ... ... ... ... ... ... | 2,40,812 | 3,69,364 |

*Other Ship Agents in Calcutta.*

| | | |
|---|---|---|
| February ... ... ... ... ... ... | 1,50,946 | |
| March ... ... ... ... ... ... | 2,44,100 | |
| April ... ... ... ... ... ... | 2,04,962 | |
| May ... ... ... ... ... ... | 37,396 | |
| June ... ... ... ... ... ... | 84,290 | |
| July ... ... ... ... ... ... | ..... | 6,19,424 |
| GRAND TOTAL ... ..... | | 11,23,790 |